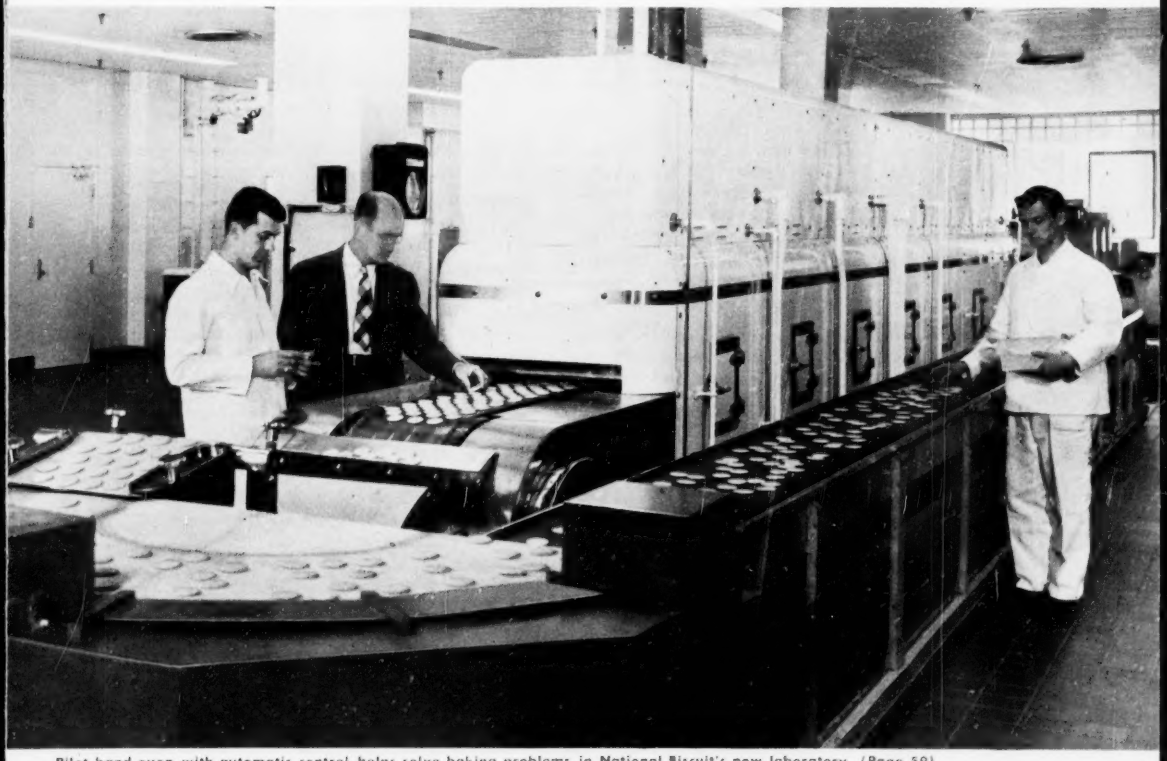
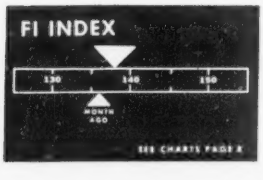
NATIONAL EDITION

Food Industries

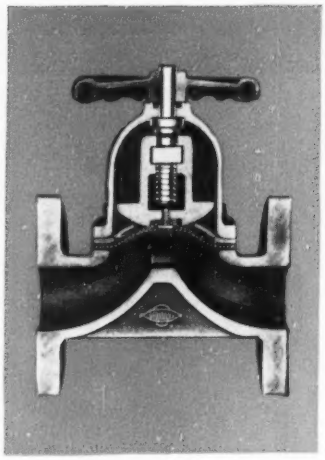
For those who control quality and costs through management and production — a McGraw-Hill publication



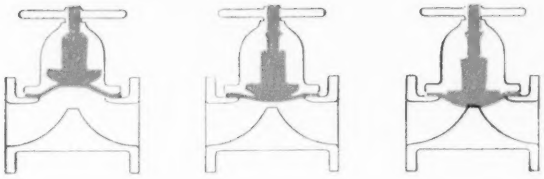
Pilot band oven, with automatic control, helps solve baking problems in National Biscuit's new laboratory. (Page 59)



JUNE, 1950: Frozen milk, Sharing of profits, Effective package colors, Remote shipping control, How to use shortening, Handling dry materials

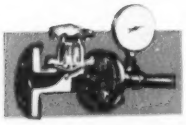


If you need a diaphragm valve you need all the advantages of diaphragm closing



Check these popular features of

GRINNELL-SAUNDERS DIAPHRAGM VALVES



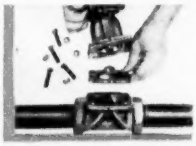
Diaphragm gives leak-tight closure against grit, scale, solid matter . . . Even when something as substantial as an 8-penny nail is trapped on the weir of a rubber lined valve, as illustrated, the resilient diaphragm, plus the large area of contact, gives leak-tight closure against pressure or vacuum.

Diaphragm lifts high for streamlined flow in either direction . . . Smooth, streamlined passage, without pockets, prevents trapping of sludge and reduces frictional resistance to a minimum—irrespective of direction of fluid flow. No disc holder in fluid stream. Grinnell-Saunders Diaphragm Valves are self-draining when installed with the spindle at 15 degrees above the horizontal position.

Diaphragm absolutely isolates working parts from fluid . . . There's no "if" about the way a continuous, one-piece diaphragm seals off the working parts from fluids; no perforation or puncture in the diaphragm where fluid or gas can possibly leak by the valve spindle. No sticking, clogging or corroding of working parts. Valve lubricant cannot contaminate the fluid in the line.

Diaphragm, body and lining materials to meet particular conditions . . . Bodies stocked in cast iron, malleable iron, stainless steel, bronze and aluminum: other materials on special orders. Valve bodies lined with lead, glass, natural rubber or neoprene. Diaphragm materials of natural rubber or synthetics. Working pressure, 150 lbs.; maximum temperature, 180 °F.

Diaphragm is only part that normally wears and needs replacement . . . Depending on the type of service, it may last for years, particularly since the compressor and finger plate combine to support the diaphragm in all positions. The diaphragm can be replaced quickly without removing valve from line. No refacing or reseating. No disc holder to require tightening or replacing. No packing glands to demand attention.



Write today for the new Grinnell-Saunders Diaphragm Valve Catalog 4-S.

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Circle numbers of items you want to know more about; fill in your name and address; drop in mail (no postage required). We will tell companies what you are interested in and they reply direct to you.

TO MAKE IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes: (1) editorial items on new equipment, new products, new literature; (2) products advertised; (3) advertisers.

WHAT THE NUMBERS MEAN

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

Editorial Items: There is a page number on the postcard for each editorial item; ABC's distinguish the specific items on the page.

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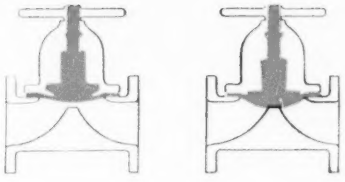

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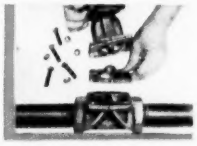

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READER SERVICE POSTCARD

EDITORIAL ITEMS

No. 17358

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91A	96C	115A	169A	169K	170C					
91B	98A	115B	169B	169L	170D					
92A	98B	115C	169C	169M	170E					
92B	98C	115D	169D	169N	170F					
92C	98D	116A	169E	169O	170G	172B	172G	174B	174G	
94A	98E	116B	169F	169P	170H	172C	172H	174C	174H	
94B	98F	118A	169G	169Q	170I	172D	172I	174D	174I	
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96A	112B	118C	169I	170A	172A	172F	174A	174F		

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4	28-29b	100	124	144b	156b	172	187	197	L210
6	28-29c	101	125a	T145	156c	173a	188	198	R210a
10	30a	106	125b	B145	156d	173b	189	199	R210b
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27	99a	123a	T143	155	170	L186	195	L209d	224b

OTHER REQUEST, OR COMMENT.....

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Name.....Position.....

Company.....

Address.....

Card Expires September 10, 1950

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EDITORIAL ITEMS

No. 17358

90A	96B	112C	118D	169J	170I					
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92B	98C	115D	169D	169N	170F					
92C	98D	116A	169E	169O	170G	172B	172G	17 B	17G	
94A	98E	116B	169F	169P	170H	172C	172H	174C	174H	
94B	98F	118A	169G	169Q	170I	172D	172I	17 D	174I	
95A	112A	118B	169H	169R	170J	172E	172J	174E	174J	
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12	30b	107a	126	B146	156e	174	190	200-201	R210c
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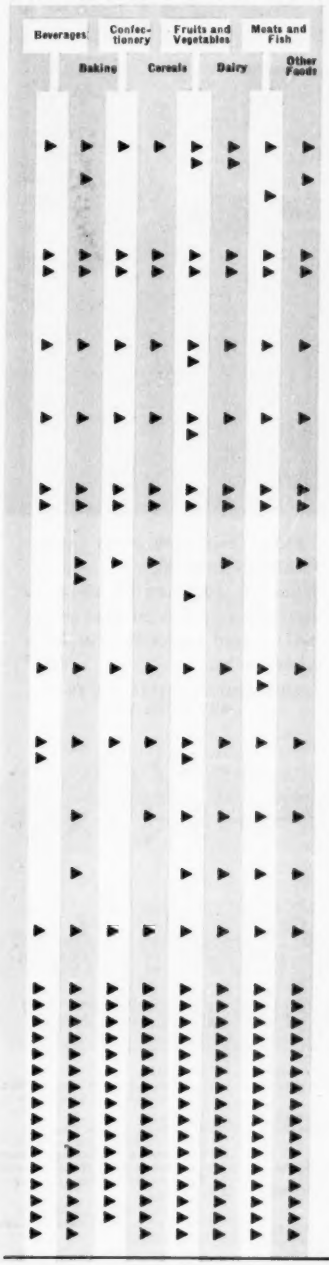

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A GROUNDED 200 hp motor recently put a large press out of commission for a midwest steel-tank firm. Dietz Electric, A-C Certified Service Shop, picked up the motor Saturday a.m. The stator was rewound and the motor back on the press in 36 hours — with no lost production time!

GET, FAST, RELIABLE SERVICE like this wherever your plant is located from your nearest A-C Certified Service Shop. There are 80 of these shops in every major industrial area in the U. S.

These independent shops are hand-picked for fine workmanship, high business standards, and excellent facilities. Their work meets factory-established standards.

When you need new motors — or matching control — call your nearest A-C Certified Service Shop or Authorized Dealer. A-3067

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San Francisco—Weidenthal-Gosliner
San Jose—Rosendin Elec. Works

COLORADO
Denver—Baker Electric Company

CONNECTICUT
Hartford—Charles H. Leppert
Waterbury—Elec. Motor Repair Co.

FLORIDA
Jacksonville—Turner Elec. Works
Miami—Penninsular Armature Wks.
Tampa—Tampa Armature Works

GEORGIA
Atlanta—Bearden-Thompson Elec. Co.
Columbus—Smith-Gray Electric Co.

ILLINOIS
Chicago—Chicago Electric Company
Marion—Giles Armature & Elec. Wks.

INDIANA
Indianapolis—Scherer Electric Co.
Evansville—Evansville Elec. & Mfg. Co.

IOWA
Sioux City—Smith Elec. & Supply Co.

KANSAS
Wichita—Tarrant Elec. Machinery Co.

LOUISIANA
New Orleans—Industrial Electric
Shreveport—Shreveport Arm. & Elec.

MAINE
Brewer—Stanley J. Loeh Company

MARYLAND
Baltimore—Keystone Elec. Co., Inc.

MASSACHUSETTS
Concord—A. S. Tracy
Roslindale—Ranney Electric Motors
Springfield—Elec. Motor Repair Co.

MICHIGAN
Grand Rapids—Grand Rapids Ind. Co.
Detroit—Stecker Electric Company

MINNESOTA
Duluth—Mielke Electric Works, Inc.
Minneapolis—Parsons Electric Co.

MISSISSIPPI
Vicksburg—Ludke Electric Company

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Kansas City—Boese-Hilburn Elec. Co.
St. Louis—French-Gerleman Elec. Co.

NEBRASKA
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Atlantic City—Charles A. Buckley
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Sioux Falls—Elec. Motor Repair

TENNESSEE
LaFollette—Standard Armature Wks.
Memphis—Ind. Elec. & Supply Co.

TEXAS
Amarillo—G. E. Jones Electric Co.
Dallas—Industrial Elec. Equip. Co.
El Paso—B & M Machinery Company
Ft. Worth—Central Electric Company
Houston—Roy A. Berentz Company

VIRGINIA
Richmond—Wingfield & Hundley
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WASHINGTON
Spokane—Lee F. Austin Company

WEST VIRGINIA
Charleston—Charleston Elec. Supply

WISCONSIN
Green Bay—Beemster Electric Co.
Milwaukee—Dietz Electric Company
Wausau—Electric Motor Service
Wis. Rapids—Staub's Elec. Shop

HIGHLIGHTS

USDA says there should be increases over 1949 in the 1950 consumption of margarine, turkey, eggs, lard, frozen vegetables, frozen fruit juices and dry edible beans. Declines may be expected in butter, chicken, fresh fruits and canned fruit juices. But the furthest they go regarding extent of rise and decline is "some."

Baltimore dairies are "bobtailing"—selling routes to driver-salesmen—because teamsters are making devastating inroads in push to organize. It started with unionization of Green Spring Dairy, which cost company $120,000 a year and immediately lost them 300 customers. Granted, the Union told President James Ward, Sr., not to worry, put pressure on hotels, restaurants, other business places that depend on other union services and came up with 11,000 new customers within a month—but leaving the rest with 11,000 fewer. More reason why frozen milk might win a big market.

Poultry and meats are being made more tasty by the use of monosodium glutamate. Eugene D. Ellis, Miami processor, has tripled poultry sales by injecting MSG solution into the meat of dressed chickens at six or seven places, at a cost of ½c. a pound of bird. Spraying into body cavity is another method of application. Meat packers are now putting MSG into sausage products and luncheon meats, and it is technically possible to add the flavor-developer to curing brine and salt for hams, butts, bacon and tongue. It's hard to think of an easier and cheaper way to enhance natural flavor.

Canned fresh milk got a big boost when International Milk Processors incorporated in Chicago. Company will design plants, provide equipment, give technical service for the process developed at Valpariso, Ind. First commercial plant is being built in Northwest to supply Alaskan, Hawaiian and Philippine markets. This development will bear watching. (See News).

Light and medium maple syrup can be converted into a much improved dark blending product with four to six times as much flavor-strength by a process developed by USDA technologists. Syrup is simply boiled at 250 deg. F. for two hours. Cost is 10c. per gal. As simple as it is effective.

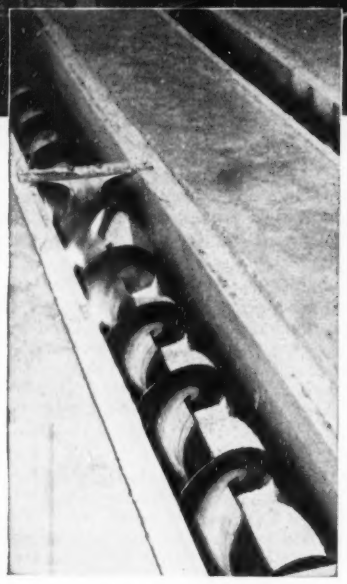
Efficiency in regulating the flow of incoming and outgoing cases has been increased and handlings reduced with a remote electronic counting and control system. Used in a Boston brewery, the unit permits the shipping department to keep tabs on empties going into the plant and full cases coming out. Automatic counts are registered in the office through a special wired hookup to photo-electric counting units on conveyors. Count for outgoing cases is preset on automatic cut-off. Five checkers are eliminated. (See Article).

Off-flavor in shelled peas is chiefly associated with their life functions during time-lapse between shelling and blanching, rather than with adhering vine juice, bacteria and other external environmental factors, according to Western Regional Research Lab. They propose development of a satisfactory mechanical pod separator so that podded peas can be held in cold storage prior to shelling. Looks like a good chance for an inventor. (See Article).

"Deadening" of cheese vats is caused by traces of penicillin. One part of milk taken from a cow 12 hr. after mastitis treatment with 200,000 units of penicillin, when mixed with 99 parts of milk taken from untreated cows was enough to cause destruction of starter cultures. So check your milk sources if you have starter trouble. (See News).

Firmness of bread can be measured on a machine described by George Garnatz, director, Kroger Food Foundation. A disk connected to a platform by means of a movable vertical shaft provides squeeze like that applied manually by the grocery shopper. (See News).

LINK-BELT
SCREW CONVEYOR
is Outstanding . . .



Pictured above is a screw conveyor installation handling cotton-seed meats to flaking rolls. Lower illustration shows a 12" diameter screw conveyor handling rough rice from dump hopper to mill.

Link-Belt originated and is the largest producer of continuous rolled Helicoid (screw) conveyor. Link-Belt also manufactures many other types of screw conveyors, including sectional flight, in a wide range of diameters and gauges, and in various metals, including stainless steel for conveying jobs where a sanitary metal is desirable. All necessary components such as collars, couplings, hangers, troughs, box ends, flanges, thrusts, drives, etc., are also available to give you one source of supply.

Link-Belt screw conveyors are compact, occupying less space than many other types of conveyors and therefore can be adapted to close clearance locations. Loading is simple—thru spouts or from adjacent conveying mediums. Covers and joints are tight, and dust seals and spring cover clamps keep dirt out, dust inside. Installation and operating costs are low.

Link-Belt engineers will be pleased to study your conveying problem and recommend a conveyor to suit your specific needs. Contact our nearest office for unbiased recommendations.

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LINK-BELT
SCREW CONVEYORS

The Talk of the Industry

May Their Tribe Increase!

Two more technical men have reached the top in food processing industries in two very successful companies.

Ridgway Kennedy, Jr., has been chosen president of Abbott's Dairies in Philadelphia. He came up through production of ice cream and is well-known for his acumen in technical matters, as well as his breadth of view.

The other man we acclaim this month is Dr. J. Max Widmer, new president of Penick & Ford, Ltd., New York. He has been elevated to the top job after 30 years with the company.

May their tribe increase!

Butter Support Backfires

If more evidence is needed that price-support operations are doing more harm than good, you have it in a resolution recently passed by American Butter Institute and sent to Secretary Brannan.

After careful study of the effects of the government's butter buying program, ABI came to this common-sense conclusion: Maximum consumption of nutritious milk and its products cannot be achieved when the government holds large quantities off the market (CCC now has about 100 million pounds of butter). So ABI's resolution asks that the butter price-support level be lowered to 75 percent of parity.

With restrictions off margarine, it is doubly important that this be done.

Frozen O.J. Booms Florida Land

Recent episodes in Florida are reminiscent of events in the late '20's and early '30's in England, when canning first had its big expansion there. New operators bid up the price of the limited supply of raw materials and then competed against each other to sell the finished products.

Some Eastern capitalists recently went to Florida with the expectation of investing heavily, but decided that the farmers were the only ones who could possibly profit from the popularity of frozen concentrates. So they fished, played golf, came home and reported that unplanted orange land was undergoing another 1926 land boom.

And frozen orange juicers look westward to Sunkist California for a source of reasonably priced fruit.

Science and the Scythe Against Hunger

Scientists have discovered algae which utilize, through photosynthesis, as much as 87 percent of the solar energy to which they are exposed. And they have a potential acreage yield a hundred times that of agricultural crops. Normally the algae contain 60 percent protein food, but they may be made to consist of 85 percent fat. Only air, water, sunlight and mineral salts are needed for their growth. Raw material cost is less than 1 cent per pound of algae.

In this development is seen one solution to the world's food problem. But a much simpler solution has been outlined by Norris Dodd, head of FAO. It involves nothing more than supplanting the sickle of backward countries with the scythe, and the crooked stick with the plow. Neither tractors nor technicians are needed. The room for improvement in farming methods in many countries is staggering.

In some respects, the two sides of the world are a far piece apart.

Trouble On the Hoof

As bluntly pointed out by the Outlook & Situation Board of the Department of Agriculture, the small cut in corn acreage planted offers no prospect of relief from burdensome feed surplus. Farmers are planting 8 percent more acreage in oats, 25 percent more in barley and sorghum, and 3 percent more in hay.

The overall feed supply next fall is almost certain to be nearly an all-time record. Animal products industries know what this means in terms of future meat animals for slaughter: Trouble!

Spin the Spinach!

Shelf-life of prepackaged fresh spinach is appreciably lengthened by vigorous centrifuging to remove the wash water from the leaves. The usual ½-minute spin is not enough, says USDA. It takes 4 minutes for best results, and this reduces the weight of the washed spinach 27.2 percent.

Removal of the water reduces bacterial soft rot of the leaves. But refrigeration in the store still is needed to keep spinach in its prime.

Hors d'Oeuvres

■ The atom bomb holds no further terrors for Secretary Brannan. He's just found out that some Oak Ridge atomicadicians have used low level radiation to not only speed up but increase potato seed germination.

■ According to one investigator, silks found in one No. 2 can of corn "measured the length of two short consumer-housewives laid end to end." While, of course, the breadth has no significance in this case, we'd still like to know.

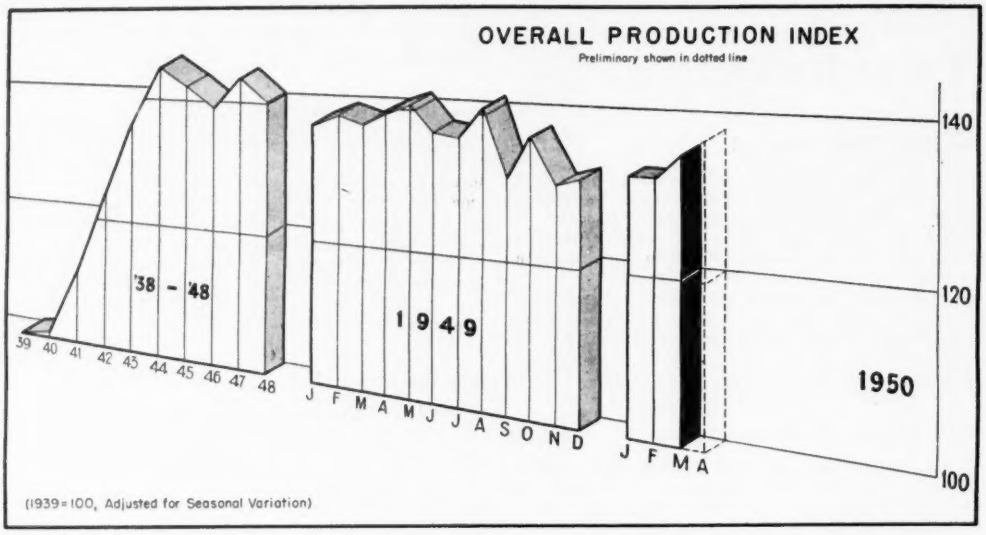
■ Anyway us humans aren't the only ones who are utterly confused. A minister driving along a flooded Washington state road, last winter, had to jam his brakes to avoid hitting a salmon headed north under full steam.

■ A diet solely of mineralized cows' milk fed to a strange species—white rats—has kept them in the pink up to very old age, at Cornell U. So it's thought maybe the same diet fed to another strange species—us—might have the same result. If you want to volunteer come young.

■ Out in Iowa, geneticists are developing hybrid chickens—presumably to help munch some of that hybrid corn that's running over the storage bins. The fowl are reported to be laying 30 percent more eggs—leaving it to Uncle Sam to wonder what the hell's to be done with 'em.

■ Fish & Wildlife biologists are supposed to be using carbon and phosphorus radio isotopes to study the feeding and digestive processes of oysters and clams. Why, goldfish get more privacy than this. **J. A. J. J**

FI Index and Outlook



Steady Rise in Overall Food Output Continues into the 2nd Quarter

Preliminary April figure reaches highest point since last August and is 2 points over March

CARRYING ALONG with the upswing in overall food production that set in during the first quarter, the preliminary April index moves up to 138, a jump of 2 points from the final March figure of 136.

The higher level of food output during the early months of 1950 has been reflected in strong demand for various materials used by food processors. Livestock prices for example, held up better than expected during the peak spring slaughter and have since increased. Prices of ingredients like sugar and edible oils have also risen, reflecting increased consumption. Packaging materials have been bought in close to record quantities. And Florida citrus has enjoyed a boom because of the heavy demand from buyers.

To a certain extent, these gains represent a recovery from the unduly low level reached last November. Processors have probably been rebuilding inventories in some lines. So whether or not the FI index continues upward depends largely, in the next few months, on the trend of orders from distributors. This is particularly true of canning, where packers hold heavy stocks of some items. The fruit and vegetable pack, most important summer activity in the food industries, may be down a bit.

The longer-run outlook, however, indicates continued strength. Good general business conditions and high consumer incomes seem likely to prevail for the rest of 1950. And under these conditions, food production should be maintained in the 135-140 range of our index.

Margarine Gets a Break

One of the most important developments in the food industries is the removal of federal restrictions on the sale of margarine effective July 1. The 10c. federal tax on colored margarine, and the ¼c. tax on white margarine, are repealed. And, more importantly, dealers will no longer have to pay federal license fees to handle margarine.

Will Increase Oleo

The result seems certain to be a gradual rise in margarine consumption. Numerous state restrictions remain. But the federal action may well be the forerunner of increasing success in repealing state prohibitions. In any event, yellow margarine can now be sold freely in 33 states having 60 percent of the U. S. population.

In these many states, yellow margarine will almost completely replace white on grocery counters, since the 10c. tax differential will be wiped out. This will be a 25 percent reduction in the price of colored margarine, which is much more popular with consumers. And since it is colored margarine primarily which competes with butter, such a price reduction should help this spread's sales at butter's expense.

An even bigger aid to margarine

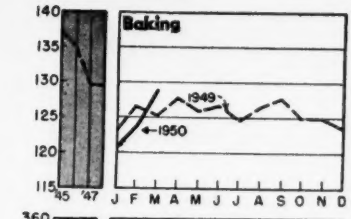
At a Glance—

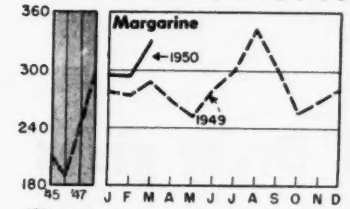
(1939 = 100, with all figures adjusted for seasonal variations.)

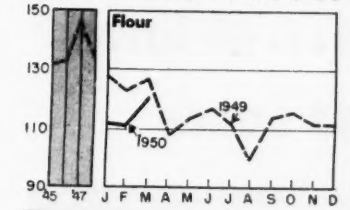
	Mar. 1950	Feb. 1950	Percent Change	Year Ago
Baking	129	124	+4	125
Butter	87	85	+2	81
Canning	147	146	+1	149
Cheese	176	169	+4	172
Confectionery	130	132	−2	132
Evap. Milk	140	146	−4	126
Flour	121	111	+9	127
Ice Cream	169	194	−13	181
Malt Liquors	175	164	+7	179
Margarine	332	294	+13	290
Meat Products	146	145	+1	145
Sugar	99	97*	+2	99

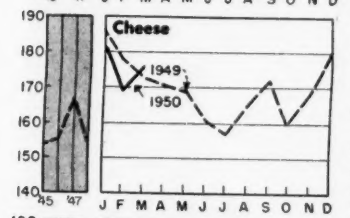
*Revised

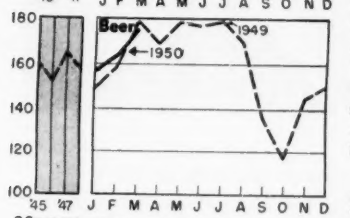
RISING ▲

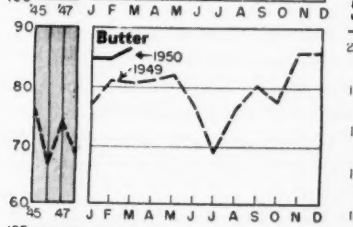


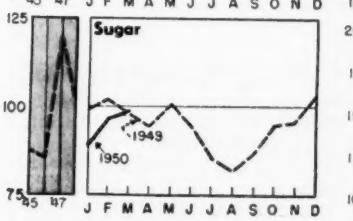












manufacturers will be the opportunity to put their product in more stores. The latest figures show only 332,000 retailers handling margarine. That's only about 60 percent of the nation's 550,000 retail food stores. And only 5 percent of food retailers are carrying the colored product. One reason for this has been the $6 a year license fee required to sell white margarine and the $48 fee for colored margarine. Another has been the trouble and expense of making monthly reports to the government. Now that none of these will be required, the number of oleo outlets can be expected to increase. And yellow margarine will probably be sold by more present margarine dealers, although some will still be restricted by state legislation. It is estimated that about seven times as many stores will be handling the colored spread.

The number of outlets has been an important factor in boosting sales of most food products. And experience suggests a similar result for margarine. In 1949, a doubling in the number of dealers handling colored oleo brought about a proportionate increase in its consumption. Widespread availability may be counted on to increase the number of impulse purchases, particularly if the bigger market encourages more national advertising.

Effect on Butter

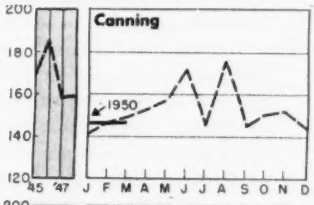
In 1950, butter output will reach 1,800,000,000 lb., according to Department of Agriculture estimates. This would be a gain of about 100,000,000 lb. over 1949. However, it will be difficult to increase butter consumption in the face of a further 10c. drop in the price of margarine. The effect would therefore seem to be even larger support-purchases of butter by the federal government. Since government holdings of butter are already very high, political pressure for a lower support price, or for some device to dispose of butter stocks, seems likely. But under the law, such action cannot be taken during 1950.

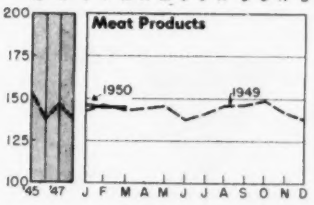
Per capita consumption of butter and margarine combined has dropped from 19.6 lb. in the 1935-39 period to 16.3 lb. in 1949, although more oleomargarine is being eaten. To make up this gap would require increasing total production of the two spreads by 500,000,000 lb. annually. The estimated 1950 rise in butter output is only about a fifth of this goal. And much of the increase may go into government stocks. If margarine retains its present price advantage, it will account for the bulk of any combined gain toward the prewar level of consumption.

Goals for 1950

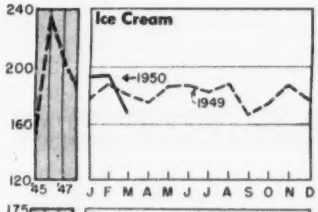
Margarine production in the first months of 1950 has been running at an annual rate of not quite 1,000,000,000 lb. If continued, this will mean a gain for the year of 100,000,000 lb. over 1949. And the industry may do even better, in view of the expected sales pick-up after July 1. Supplies of its principal ingredients—cottonseed oil and soybean oil—are expected to be ample. And the 59 margarine plants now operating are believed to have a combined capacity somewhat greater than their current total rate of production.

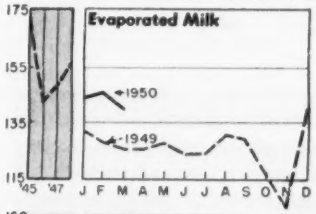
STEADY →

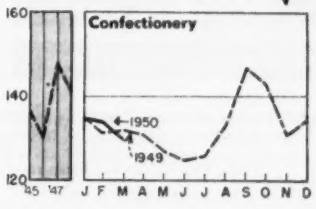




FALLING ▼







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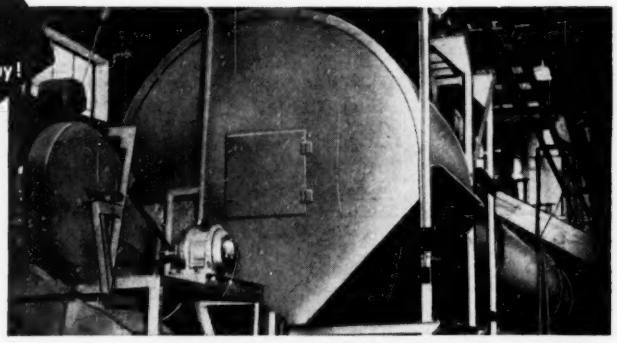

FORMER DRYER

Installed cost	$60,000
Annual production (tons)	6,000
Drying cost per ton	4.65

(space required, 2500 sq. ft.)

LOUISVILLE DRYER

Installed cost	$15,000
Annual production (tons)	9,000
Drying cost per ton	1.15

(space required, 1000 sq. ft.)

YEARLY SAVINGS of LOUISVILLE DRYER in OPERATING COSTS ALONE $21,000

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A dryer was designed specifically for his operations. Its performance was pre-determined in our own unique research laboratories and pilot plant. *The new dryer turns out better, more valuable production in less space—with great savings in annual operations.*

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What Washington Thinks

AIR COOLER INSPECTION—Bureau of Animal Industry has issued a new meat inspection memorandum on sanitation of cold air diffuser units. The occasion was a mold contamination of meat products, especially frankfurters, by cooled air carrying various organisms. Systematic shutdown for inspection and cleaning of cooler surfaces is recommended. Otherwise the diffuser units may develop mold growth and thus contaminate the air used for food cooling. Presumably many other plants not yet seriously affected will profit by the newly required daily and weekly cleanings.

"ADULTERATED"—A frozen product made in semblance of ice cream, but containing vegetable fats in complete or partial substitution for milk fat, is adultered within the meaning of the Federal Food, Drug, & Cosmetic Act. This is the categoric finding of Food & Drug Administration with reference to such products currently made for intrastate sale. And apparently there is no way by which such products can be labeled to be legal in interstate commerce so long as they look like ice cream.

TARIFF PROBLEM—U. S. Tariff Commission agreed to begin hearings on May 16 to determine whether prospective imports of various tree nuts were likely to be offered in the United States "under such conditions as might interfere with any USDA program." This is the first time the commission has given any serious attention to the impact of imports on domestic supplies of foods. It seems that when industry complains, the charges are dismissed as unimportant. But when the Government itself is embarrassed . . . well, that is different.

"FULL OF DYNAMITE"—A new method of insect control, by making parts of the plants toxic to insects, is a proposal that has been characterized by one of the outstanding government entomologists as "full of dynamite." S. A. Rohwer, in making this statement, was referring to the use of certain pyrophosphates and phosphoramides on plants in such a way that the leaves of the plants would be themselves toxic enough to kill insects or perhaps even animals who may attempt to eat them. Rohwer's concern is obviously based on the question as to what might happen to the baby if fed spinach puree made from such treated vegetation. Or mama and papa, too. We doubt whether food producers are going to welcome this insecticide technic.

SECURITY CLAUSE—When Uncle Sam makes a deal with a commercial or research group to allow sale of government facilities or to support some technical investigations, there is usually included in the contract of sale or cooperation a provision that is called a "national security clause." This is intended to insure to the government full right of recapture of the property or of the findings reached in the event of a military emergency. Heretofore, these arrangements have usually been made in a form worked up especially for each contract. Now there has been drafted a series of standard forms (published by Munitions Board) especially relating to the transfer of surplus property. Food companies having dealings with the government will know what they are up against much more clearly now by studying these new accepted forms as published in *Federal Register* on April 1. In view of the many ways in which the government continues to have dealings of this sort with manufacturers, it is important that all technical executives be acquainted with the restrictions which the National Security Clause may impose on them.

EGG DIP—To control Newcastle disease, Bureau of Animal Industry specialists are recommending the dipping of eggs in chemical solution before incubating. Hatchability of the eggs is not decreased by a five minute immersion in the recommended solutions. Rumor has it, however, that some of these solutions are not so satisfactory where egg flavor is a factor. Egg users should interest themselves in this problem lest their egg-containing products smell like a hospital corridor, as some folks think.

CHRONIC EXPOSURES—Industrial managements dealing with odor, fume, and dust problems in industry are confronted with a new and somewhat alarming interpretation from government officials. It is hard to pin this down, since all the government individuals seem to be quoting each other and never accepting responsibility for initiating the alarming comment. But this is serious, for the criticism of industry goes along like this: *Industry which pollutes the atmosphere with anything subjects all of the neighbors to chronic exposures. Thus the general public may be more seriously affected than the workmen in the plant itself.* There appears to be no tangible evidence offered. But at least three departmental groups are talking this way. And it will be surprising if some government do-gooders do not rise up and attack companies from this new speculative platform.

RAW SEWAGE — Public Health Service has completed a survey of the stream pollution caused by the discharge into waterways of untreated sewage. Approximately half the population of the country is served by sewer systems. Of this total, 25,000,000 people are in communities that discharge sewage untreated to pollute streams. It does not look as though manufacturing industry was nearly as wicked as urban managements. But even so, the campaign to prevent pollution from food plants will continue to go forward aggressively in Washington.

COLD STORAGE EGGS—Long in controversy has been the question as to rates of quality loss in eggs after cold storage as compared with non-storage eggs. Now comes Production & Marketing Administration with the research conclusion that depreciation of eggs after storage is no different from depreciation of the non-storage variety, if they are kept under comparable conditions during handling and distribution. Evidently, the stigma often attached to eggs once stored under refrigeration is not deserved. But an old egg is still an old egg.

GUARANTEED EMPLOYMENT — Highly seasonal industry is at a substantial disadvantage in collective bargaining with wage earners in so far as guaranteed employment is a part of the wage contract. Typical agreements of this sort have been summarized by Bureau of Labor Statistics in Labor Bulletin No. 908–15. Managements with union problems, whether seasonal or not, need to study the types of guarantees that are being suggested to labor negotiators in this booklet. (It costs 20c. from Government Printing Office, Washington D. C.)

—R. S. McBride, Washington, D. C.

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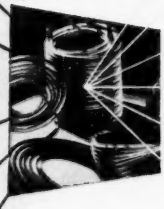
TRENTWELD beverage tubing

Perlick Picnic Cooler

check these features of TRENTWELD!



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TRENTWELD Beverage Tubing is made in a *tube* mill by *tube* engineers who roll and weld stainless and high alloy tubing *exclusively*. Whether your requirements are tap rods, cooling coils, beer lines . . . there's a TRENTWELD Beverage Tubing to meet your requirements. When you think of tubing . . . call in Trent. Write for your copy of the TRENTWELD DATA BULLETIN.

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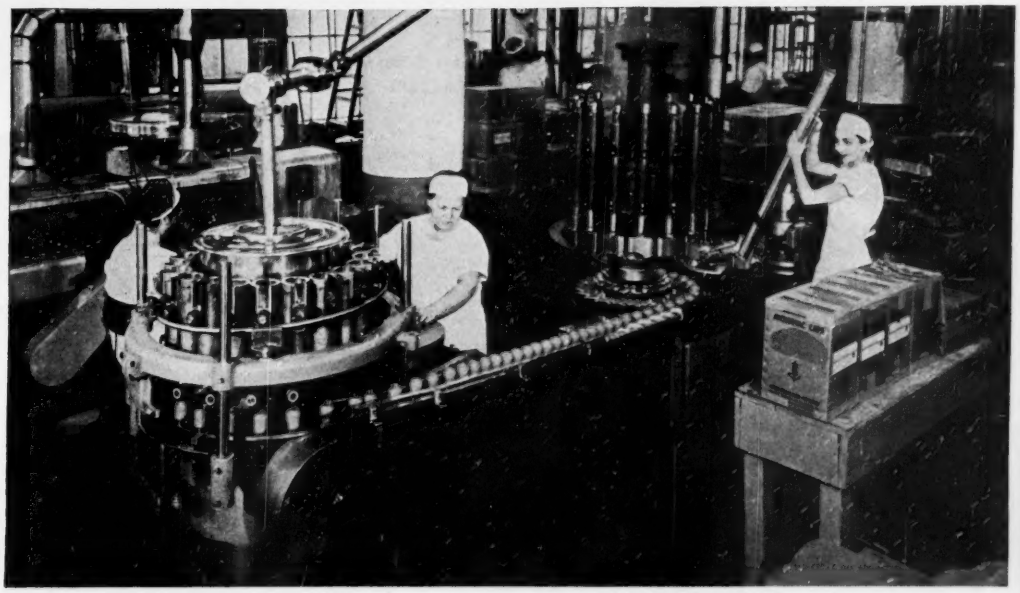

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- The Pfaudler Filler, operating at a maximum speed, filled 50 more jars per minute. This adds up to 3000 more per hour, 24,000 more per day or 7,200,000 more jars per 300 day year. At a minimum profit of $.01 per jar, the total yearly savings with the Pfaudler Filler is $72,000,00!
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Consequently, it is estimated that Pfaudler Filler will result in over $136,000 annual savings. Think of what savings like this would mean for you.

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- **Instantaneous volume adjustment controls fill within 1/10 of an ounce.**
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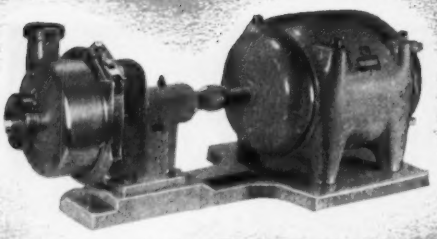

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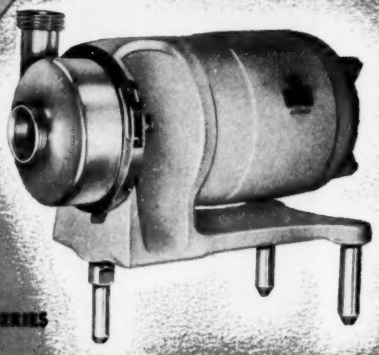
STANDARD SERIES
SANITARY TYPE

This model has been designed for the non-agitating, efficient pumping of milk, food products such as diced carrots, cream style corn, tomatoes, applesauce, relish and beverages. It is also practical in breweries and for the pumping of drugs and chemicals in solution.



Tri-Clover
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SANITARY TYPE

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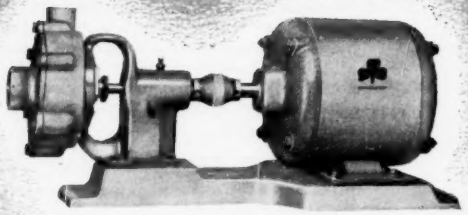
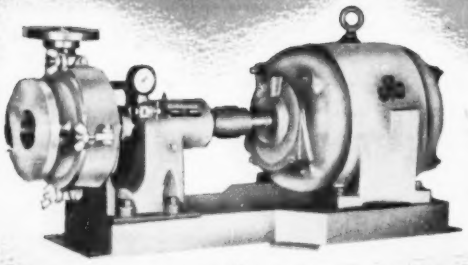


Tri-Clover
STANDARD INDUSTRIAL TYPE

A popular model in the general industrial field for pumping water, brine, light oils, chemicals or paints. Available with I.P.S. screwed or flanged connections.



Tri-Clover
HEAVY DUTY
INDUSTRIAL TYPE

Here is the model that is in demand to pump latex, water, brine, light oils, chemicals, paints, brewery products, and for liquids in the food processing field where lines are of heavy I.P.S. type. This model offers quick disassembly feature for ease in cleaning.

WRITE FOR NEW CATALOG

Tri-Clover
MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES — TRI-CLOVER — THE Complete LINE — FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

TRI-CLOVER PUMPS WILL HANDLE ANY PRODUCT THAT WILL FLOW TO THEM

Sugar means QUALITY...That's why

SUGAR MEANS SALES!

WHY DO SO MANY MANUFACTURERS OF FOOD PRODUCTS RELY ON SUGAR FOR BEST RESULTS?

Because they take no chances. They know that only sugar gives them the quality that makes their brands household bywords.

★ **Sugar is universally accepted.** Food processors, confectioners and bottlers use it, because you can't get that real goodness with anything else. Sugar points up all natural flavors.

★ **Sugar is economical.** It can be used alone—in all prepared foods and beverages. No need to fiddle around with a complicated mix. Sugar offers you the most for your money —10% to 50% more sweetening power than other sweetening ingredients.

★ **Sugar is uniform.** Real sugar, derived from the sugar cane and the sugar beet, is brought to you just as nature made it. That's one reason it's always uniform, unmatched in purity.

Why risk customer dissatisfaction? Always use sugar for the full rich flavor, the better *value* that means better sales!

SUGAR INFORMATION INC.
NEW YORK 5 NEW YORK

THERE IS NO SUBSTITUTE FOR SUGAR

TIME to get them on your side

The higher-income families who do more entertaining, and are the best customers of better food stores.

The leaders who shape the country's attitude toward food products and food selling.

/SPECIAL TO FOOD INDUSTRIES READERS/
GOVERNMENT RESEARCH INDICATES THAT HIGHER INCOME FAMILIES SPEND 62 PER CENT MORE FOR FOOD THAN AVERAGE U.S. FAMILIES.

///NEW DUN & BRADSTREET SURVEY SHOWS AVERAGE TIME SUBSCRIBER FAMILY INCOME IS $9,535 -- MORE THAN TWICE NATION,S AVERAGE///
CONFIRMED ABOVE WITH CHECKS OF BEST CUSTOMERS OF FOOD STORES IN
BALTIMORE, MD.
ERIE, PA.
QUINCY, MASS.
OAK PARK, ILL.
RESULTS/TIME IS "FIRST CHOICE" MAGAZINE/

/BROKER INFORMATION FOLLOWS/
READY ALSO WITH FINDINGS FROM SURVEY AMONG LEADING FOOD BROKERS ACROSS THE COUNTRY--
56.8 PER CENT READ TIME REGULARLY
TIME RECEIVES GREATEST NUMBER OF "FIRST CHOICE" VOTES

/MORE KOMING/

HAVE POLLED THE FOLLOWING GROUPS WHO HELP INFLUENCE PUBLIC OPINION ABOUT THE FOOD BUSINESS--
MEMBERS OF AMERICAN MEDICAL ASSOCIATION
MANAGING EDITORS OF DAILY NEWSPAPERS
TOP GOVERNMENT OFFICIALS IN EXECUTIVE BRANCH
RESULTS SIGNIFICANT--
MORE THAN HALF OF THESE IMPORTANT PEOPLE READ TIME REGULARLY/TIME VOTED "FIRST CHOICE" MAGAZINE OVER ALL OTHERS.

/FOR YOUR ACTION/
WATCH THIS SPACE FOR MORE INFORMATION ON YOUR BEST CUSTOMERS OR WRITE, WIRE, PHONE
THOMAS E. RYAN, TIME MARKET RESEARCH
9 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.

TIME MARKET RESEARCH DEPARTMENT

To get them on your side reach them in their own first-choice magazine... TIME

The Weekly Newsmagazine

HIGHER TEMPERATURES • HIGHER PRESSURES

SIZE-FOR-SIZE, *AT NO EXTRA COST*

New

FORGED STEEL VALVE

OIC SETS THE PACE IN VALVES

Here's the answer to your toughest pressure-temperature problems! It's the brand-new OIC Figure 1221, designed to take *higher* pressures, higher temperatures, tougher all-around operating conditions—with *no* increase in cost over its most popular competitors. It gives you a bonus of safety on your standard applications, and you needn't "step up" to more expensive valves to meet extra-high job ratings. You can *standardize* on the complete OIC forged steel line. You're in for a pleasant surprise when you check specifications of the new forged steel series, so don't wait. Call your nearest OIC distributor. *See this valve now!*

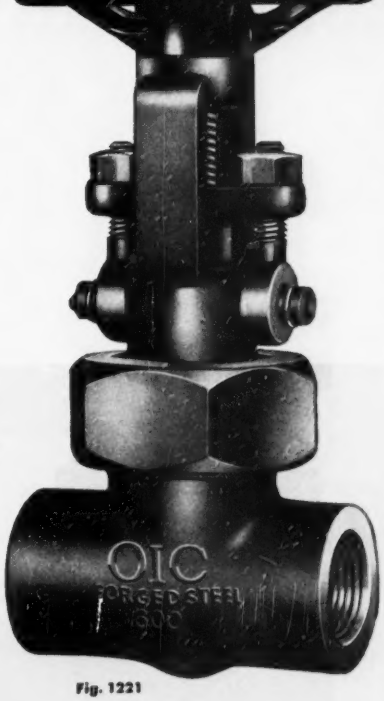


Fig. 1221

FIGURE 1221, shown right, comes in two standard trims—CH for oil or oil vapor at temperatures to 1000° F.;

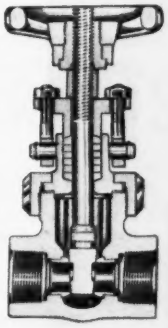
HCH for steam and other non-lubricating fluids to 850° F.

FORGED BODY, with wedge-guide machined in true relationship with bonnet joint for perfect alignment. Seat rings, of 13 Chrome stainless steel sealed tightly against body, keep out corrosive liquids, cut chemical action.

STEM, of 13 Chrome stainless steel, mates with a back-seating surface on bonnet, so valve can be repacked under full pressure. Wedge is a one-piece forging of 13 Chrome or hardened stainless steel, depending on trim.

OS&Y construction protects stem-threads from fluids and hot internal temperatures. Easy lubrication.

ALL METAL SECTIONS are extra-heavy to *exceed* recognized construction codes. Grain-pattern of forgings adds strength, provides safety, reduces wear.



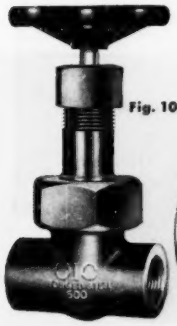


Fig. 1021

Fig. 1320

THERE ARE 262 DIFFERENT VALVES in the OIC forged steel line. It's the *longest* line ever presented to the trade at one time. Shown at left are two more gate valves—inside screw, Fig. 1021, and flanged end, bolted bonnet, Fig. 1320. But whether you need gates, globes, angles, or checks, be sure to investigate the *complete* OIC forged steel series. Write immediately for free descriptive material.

OIC

VALVES

FORGED STEEL • IRON
CAST STEEL • BRONZE

THE OHIO INJECTOR COMPANY
270 Main St. Wadsworth, Ohio

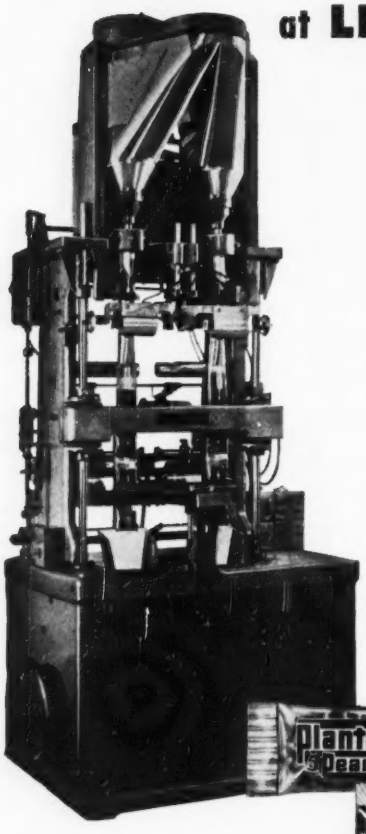
0-450-A

TRANSWRAP

THIS READY-MADE BAG, HAND-FILLED
Approximate Cost
Labor and Materials
$7.00 per thousand

THIS *AUTOMATIC* TRANSWRAP PACKAGE
Approximate Cost
Labor and Materials
$3.29 per thousand

AUTOMATICALLY produces a better-selling package at LESS than HALF THE COST



TRANSWRAP—industry's most practical and efficient packaging machine—forms, fills, seals and delivers a better-looking, better-selling package for your product. . . completely automatically.

In cost, the *finished filled* TRANSWRAP units actually run less than half the price of ready-made *empty* bags for manual processing. And, because a single operator can handle a whole battery of TRANSWRAP machines, wage savings are phenomenal.

TRANSWRAP is equally efficient for powders, solids, tablets and even liquids. Standard packaging materials which may be used include cellophane, Pliofilm, glassine, roll foil or other suitable heat-sealing materials. Package capacities range up to 80 cubic inches in volume and often may exceed one pound in weight. Custom-engineered adaptations are possible to meet your individual requirements with maximum efficiency.

Model "B" Transwrap with auger feed. Also adaptable to Volumetric or liquid feed. Produces 40 to 75 pkgs. per minute.

Also Available—
Model "A" Transwrap
For small and unit packages. (2⅜" x 6" Max.) Speeds to 150 pkg/min.

WRITE FOR FREE ILLUSTRATED BROTHURE

Manufactured and Sold by

TRANSPARENT WRAP MACHINE CORPORATION

Route 17 and Henry Street, Hasbrouck Heights, New Jersey

Large Installation or Small . . .

▲Food in this super market is kept fresh by 30 "Freon"-charged Frigidaire compressors and cooling units.

▶"Freon" refrigerants are also used in the compact compressor unit which cools this small locker plant.

FREON REFRIGERANTS SPELL SAFETY

FOR YOUR STOCKS OF FROZEN FOODS

It's sound business sense to protect your frozen and refrigerated food investment in every way possible. The *first* precaution is to select refrigerating equipment designed to use "Freon" safe refrigerants.

For example, "Freon" refrigerants won't contaminate food, even if the equipment should develop a leak. These refrigerants are nontoxic, nonflammable, noncorrosive, tasteless and practically odorless.

Furthermore, "Freon" refrigerants actually help to prevent equipment breakdowns. They contain no acids which might corrode operating parts or react unfavorably with lubricating oils. And their extreme dryness reduces the risk of freezing in capillary tubes and valves.

That's why "Freon" refrigerants spell safety—why they help safeguard your investment. So, when you are considering a proposed refrigeration installation—large or small—ask your consulting engineer or equipment manufacturer about "Freon." He will gladly recommend equipment designed to use "Freon" safe refrigerants.

KINETIC CHEMICALS, INC.
Tenth and Market Streets
Wilmington 98, Delaware

KINETIC

FREON *SAFE* REFRIGERANTS

"Freon" is Kinetic's registered trade-mark for its fluorinated hydrocarbon refrigerants.

TIME AND TIME AGAIN!

IN CAKES • IN COOKIES • IN SHORTENINGS • IN PASTRIES

Alva IMITATION BUTTER

has proven its outstanding superiority.

The truer flavor character of real creamery butter

Unusual ability to withstand higher baking temperatures

Considerably longer shelf-life in baked goods

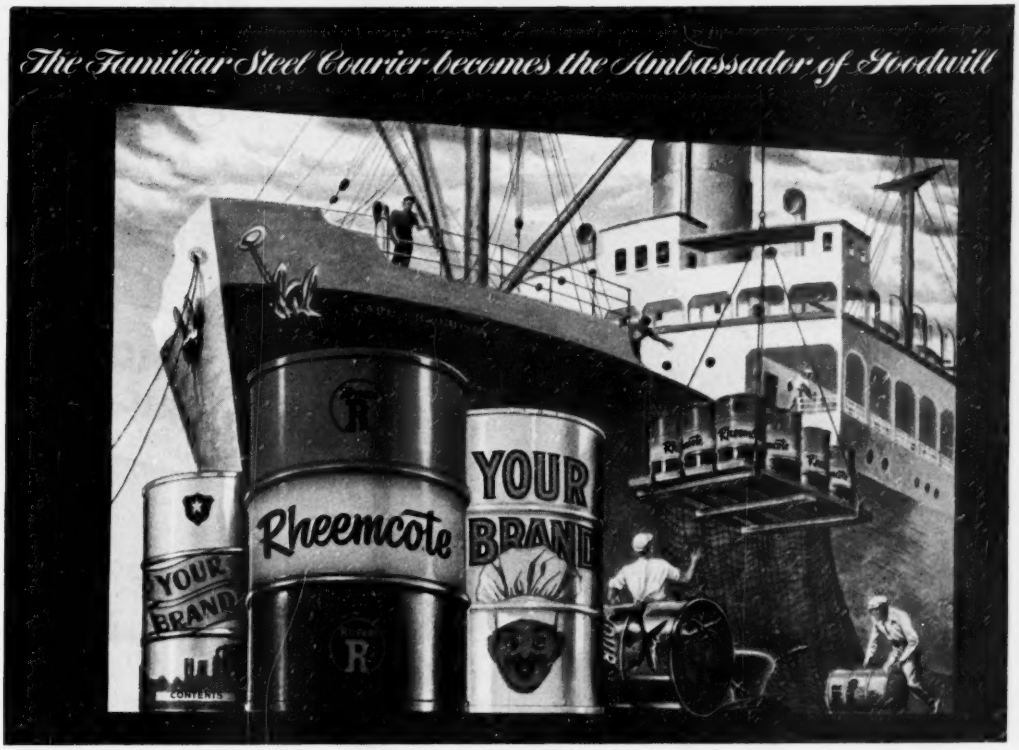
Surprisingly economical to use

Test panels as well as normal production runs have conclusively shown that **ALVA BUTTER** is the outstanding leader from the standpoint of flavor, stability and economy, in the field of artificial butter flavorings. **ALVA** imitation **BUTTER** is supplied in several forms adaptable for specific uses. **WE WANT YOU TO TRY IT!** Tell us the products you are making and we'll send you a sample of the right **ALVA BUTTER** to improve your product.

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS

The Familiar Steel Courier becomes the Ambassador of Goodwill



NOW! COLOR PACKAGING FOR LARGEST STEEL SHIPPING CONTAINER!

New RHEEMCOTE Process Produces First Completely Lithographed and Inner Roller-Coated 55-Gallon Steel Drum

Color schemes, trademarks and designs, however intricate, may now be accurately reproduced on the biggest of all steel shipping containers.

Striking possibilities of the new, exclusive *Rheemcote* process, as shown above, are the result of years of Rheem research—and development of the world's largest metal-decorating press.

Remarkable for its merchandising value alone, the *Rheemcote* drum not only promotes—*it protects!*

A roller-coated lacquer lining seals the inner drum surface with glass-like purity . . . and thus opens the door to improved packaging for products which heretofore have been difficult to contain. New electric "Resistance" welding produces smooth, strong seams, eliminates scale and burn-off metal. A hard, lustrous, exterior finish assures utmost durability against severe weather and handling.

Users of steel containers may at last achieve uniformity of packaging – and the opportunity to billboard their products and name before the eyes of the world!

The Rheem Manufacturing Company, world's largest maker of steel shipping containers, is particularly proud to have developed the Rheemcote Process in this its 25th year of service to industry.

For a descriptive, beautifully illustrated brochure on this important contribution to marketing—write direct to Rheem today. No cost or obligation, of course.

Rheem R

RHEEM MANUFACTURING COMPANY • 570 LEXINGTON AVENUE, NEW YORK 22, N. Y.
Plants and Affiliates Throughout The World

Rely on Rheem to Deliver Your Goods..and Goodwill

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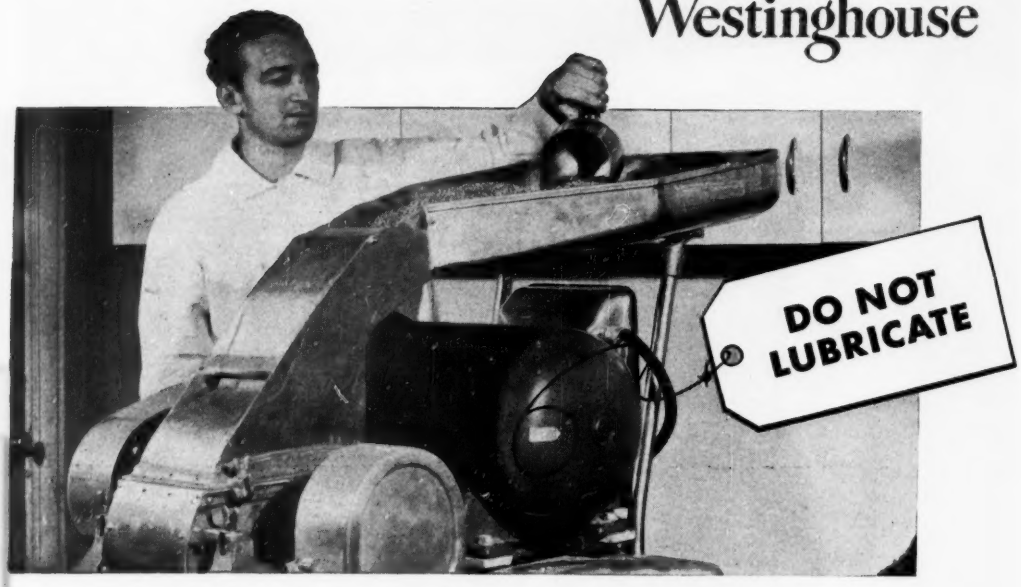
YOU CAN BE **SURE**.. IF IT'S

Westinghouse



A THOUGHT FOR FOOD:

No Dripping Grease

Never grease a Life-Line motor. Install it and forget it. That's because Life-Line prelubricated bearings have the grease sealed in. Cleanliness is assured. There are no dirt-accumulating cavities . . . no grease cups and fittings . . . no dripping grease to contaminate food.

What's more, product performance records show Life-Line motors, with prelubricated bearings, average 41% fewer bearing failures than the *best conventional-type motor* ever built by Westinghouse. Results of an extensive survey indicated a yearly savings—from lubrication alone—of $270 per year per 100 motors.

But, bearings are only part of the story. Life-Line's sleek all-steel design is easy to keep free of accumulating dust . . . is easy to keep clean. In fact, you'll find Life-Line makes "good housekeeping" very easy.

Get the facts of this complete line of motors—totally-enclosed, fan-cooled, drip-proof, splashproof and sanitary motors. Ask your nearby Westinghouse representative for complete facts on Life-Line or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-21561

---- *If you figure* **LIFE COST** *. . you'll figure* **LIFE-LINE** ----

Westinghouse *Life-Line* Motors

INDUSTRY'S LEADING MOTOR

SAME SUPERB PRODUCTS, but a new and more familiar name! To identify these oils as members of the Archer-Daniels-Midland family, and to avoid confusion with other products, we have changed the name of ADM's great new soybean salad and cooking oils from Supersoy to Archer "C" and Archer "S". Keep your eye on Archie the Chef—for pleasant news about finer foods!

TASTE 'EM . . . SMELL 'EM!

That's all the testing you will have to do, to realize that something really important happened when Archer-Daniels-Midland entered the field of edible soybean oils.

As the nation's largest processor of oilseeds, ADM brings to the food industries a wealth of laboratory research experience and know-how in the techniques of refining. That background, plus a splendid new refinery at Decatur, Illinois have already created tremendous interest in these new ADM products.

Both ARCHER "S", our salad oil, and ARCHER "C", our cooking oil, are refined, deodorized and winterized by continuous process. Passed through vacuum in the refining towers as a thin film, they are given a clarity of color, blandness, purity and uniformity that are simply not obtainable in batch processing.

Before you make any further decisions about soybean salad and cooking oils . . . *mail the coupon below.*

NOW . . . AMERICA'S FINEST EDIBLE SOYBEAN OILS ARE CALLED

Archer

SALAD AND COOKING OILS

● ORIGINALLY INTRODUCED AS **"Supersoy"**

Made at Decatur, Illinois by

ARCHER-DANIELS-MIDLAND CO.

HOME OFFICE MINNEAPOLIS, MINNESOTA

ARCHER-DANIELS-MIDLAND CO.
600 Roanoke Building • Minneapolis, Minnesota

● Please send sample of ☐Archer "S" Soybean Salad Oil ☐Archer "C" Soybean Cooking Oil

Name_____

Company_____

Address_____

City_____ Zone____ State_____

you get

SPARKLE plus

proven product protection

with packages of

ALCOA

ALUMINUM FOIL

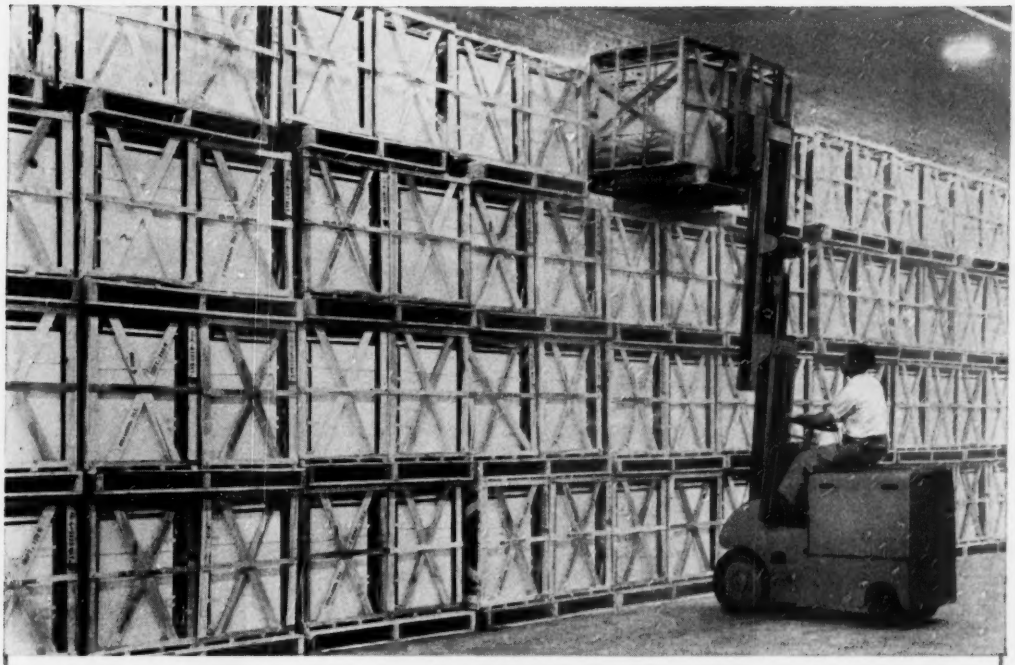
Standouts . . . in any company! Their wrappers* of Alcoa Foil mean real protection, sparkling sales appeal. In transit, in storage, in the home . . . pure Alcoa Aluminum Foil guards freshness, seals out moisture, blocks absorption of foreign odors.

Leading manufacturers—in many fields—know the advantages of wrapping in Alcoa Foil. Today's customers look for their money's worth outside, as well as inside.

Why not give your product a lift? Write today for names of leading package manufacturers experienced in designing better packages using Alcoa Foil. Address: ALUMINUM COMPANY OF AMERICA, 1763F Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM

* Wrappers manufactured by Shellmar Products Corp. from Alcoa Foil



You get FULL SHIFT trucking operations with

EXIDE-IRONCLAD BATTERY POWER

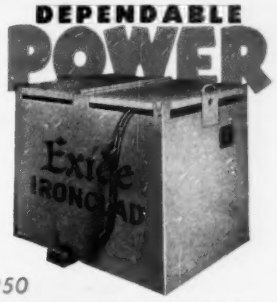
You can count on uniform performance throughout each shift when your battery electric trucks are powered by Exide-Ironclads. Your trucks will handle as much load during the last hour as during the first . . . with practically no difference in speed . . . with no unscheduled periods of down time.

Exide-Ironclad Batteries deliver power instantly to meet all demands—light or heavy—in *start-stop*, *lift-and-shift* manipulations. They assure you finger-tip control, accurate spotting, easy maneuvering, safe handling. You also benefit from the savings that Exide-Ironclad Batteries provide—low operating costs, low maintenance costs, an exceptionally long life . . . proved in more than 100,000 heavy-duty jobs.

The combination of these superior characteristics make Exide-Ironclad Batteries your best power buy . . . *at any price.*

Write for more facts and FREE copy of Exide-Ironclad Topics. It contains latest developments in materials handling . . . shows actual case histories.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 32
Exide Batteries of Canada, Limited, Toronto

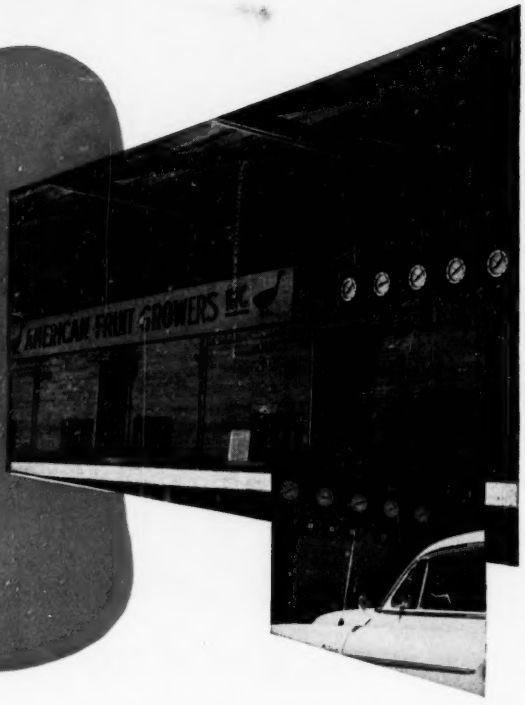


1888 . . . DEPENDABLE BATTERIES FOR 62 YEARS . . . 1950

"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*

A WHOLE NEW CONCEPT OF INSTRUMENTATION IS REVOLUTIONIZING THE FOOD INDUSTRY FROM COAST TO COAST!

ON-THE-DOT TEMPERATURES ...WITH BROWN *Electronik* CONTROL...DECIDE BETWEEN A CHILL AND A FREEZE



THE TINY temperature zone between a chill and a freeze is vital to the protection of fruit . . . and American Fruit Growers have learned how to guard it!

The extreme precision and accuracy of high speed *ElectroniK* Controllers . . . coupled with amazing thermocouple sensitivity . . . regulate and record the temperature of chilling rooms used for storage of fruit before shipment. And the set-up is so dependable that Mr. George Beck, Supervisor of Refrigeration, checks the chill-room temperatures without getting out of his car . . . assured that Blue Goose fruit arrives at eastern markets with uniform, tip-top quality.

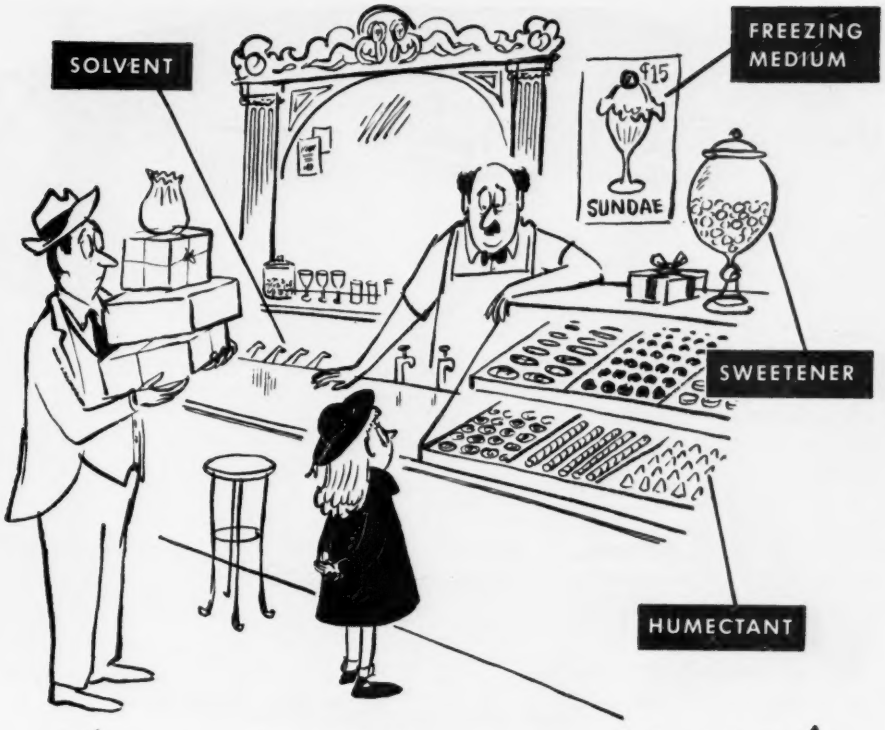
This is but one of thousands of pace-setting installations of Brown *creative instrumentation* in the Food Industry. You, too, can benefit from a control system suited specifically to your purpose. Call in your local Honeywell engineer for further information . . . he is as near as your phone!

COMMERCIAL • RESIDENTIAL • INDUSTRIAL
WORLD'S LARGEST ORGANIZATION FOR ADVANCED INSTRUMENTATION AND CONTROL

Creative instrumentation is the engineered application of cost-reducing instruments and controls

MINNEAPOLIS-HONEYWELL REGULATOR CO.
BROWN INSTRUMENTS DIVISION
4502 Wayne Ave., Philadelphia 44, Pa.
West Coast Offices: Los Angeles, San Francisco, Fresno, Portland, Seattle and Spokane

MINNEAPOLIS Honeywell — *Creative Instrumentation* FOR THE FOOD INDUSTRY — BROWN INSTRUMENTS

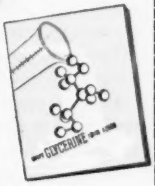


If you value freshness... try Glycerine!

TODAY'S consumer—like this youngster—sets a high premium on *freshness* in foodstuffs! That's why U.S.P. Glycerine is called upon so frequently—to maintain freshness, good appearance, and palatability, and to prevent excessive drying, crumbling and graining in many food products. Then too, versatile Glycerine is an effective sweetener . . . a solvent in flavoring agents . . . a humectant in confectionery creams . . . and a non-toxic freezing medium—widely used in candies, ice cream and food staples! Whatever its application, U.S.P. Glycerine can be used with absolute confidence in food processing, because it is *safe*, edible, and actually nutritious when digested! Why not brush up on the role Glycerine plays in your business? The attached coupon will bring you a copy of "*Why Glycerine for Foods?*"—describing well-known Glycerine applications in a wide variety of food products.

TOMORROW—there's a bright future for U.S.P. Glycerine not only in the realm of food processing—but also in food packaging. It is already recognized as an essential plasticizer in the manufacture of sausage casings, wrapping materials, and the like—and every indication points to wider use of Glycerine for improving the properties of coatings applied to food containers. A recent paper describes a Glycerine-containing formula for producing a water-soluble varnish that's especially suitable for coating metallic surfaces of food containers. The resultant baked films are said to be definitely improved in moisture and heat resistance and freedom from tackiness as compared to films obtained from alcoholic solutions. Further details will be sent on request. (Please use your company letterhead.) Here's another good reason why—in food processing and food packaging—*nothing takes the place of Glycerine!*

Nothing takes the place of Glycerine



GLYCERINE PRODUCERS' ASSOCIATION
295 Madison Avenue, New York 17, N. Y.

PLEASE SEND A COPY OF 8

Glycerine for Foods?"

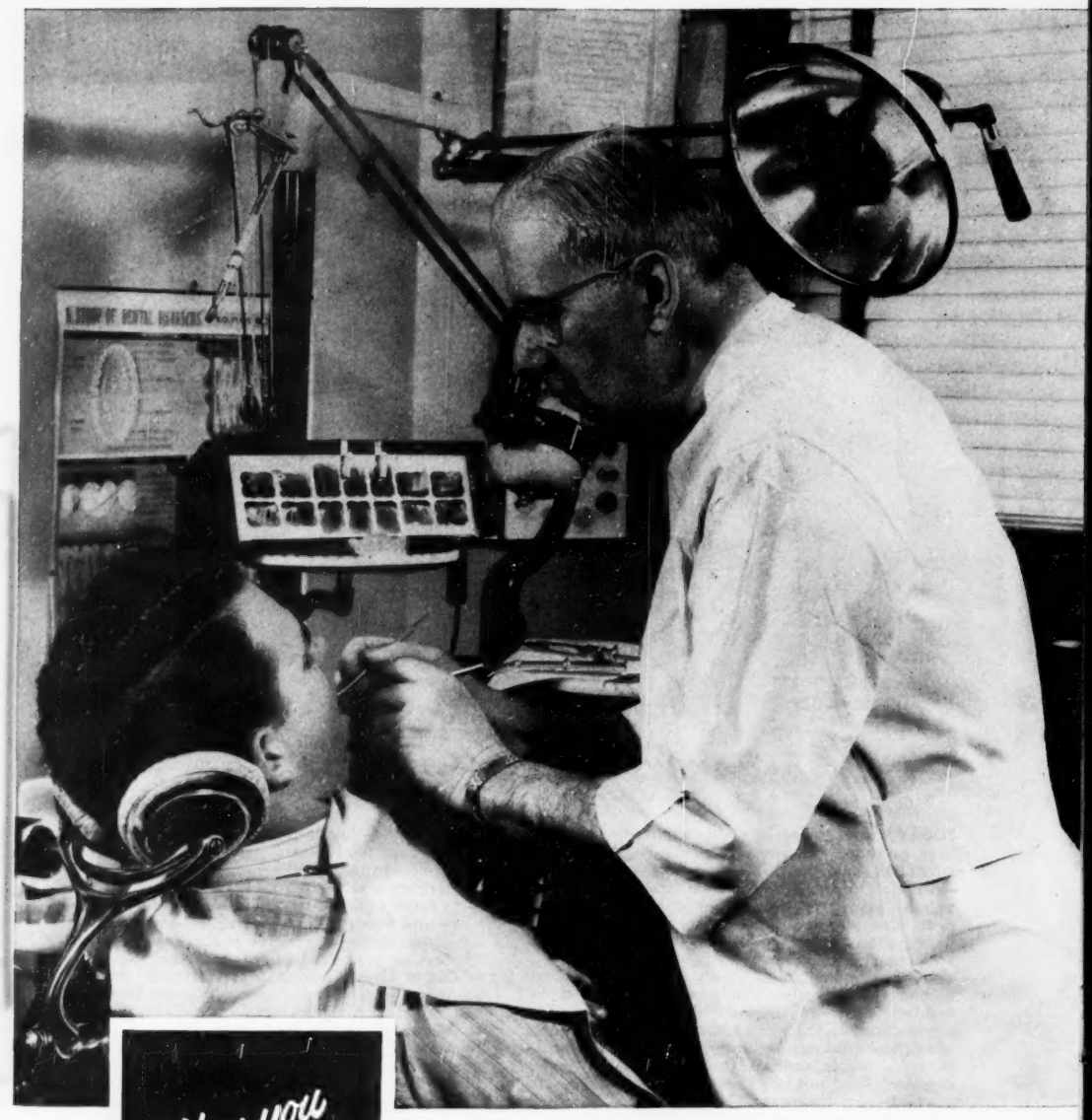
Mr._____

Title_____

Company_____

Address_____

City_____ Zone____ State_____



When you want the BEST go to the BEST

And for Packaging it's GLASS

The transparent glass package displays your products with all their colorful eye and appetite appeal. High in chemical durability, it does not change their taste or aroma, will not rust, corrode or leak. Easy to open, easy to use, easy to reseal to protect unused portions, it makes the most convenient package. It lends itself to individuality in size and shape, hence is adaptable to any product. Preferred by consumers because it is sanitary and convenient . . . by retailers because of its sales and merchandising advantages. Anchor Hocking Glass Corporation, Lancaster, Ohio.

Anchorglass*

VEGETABLE AND FRUIT JARS

These light-weight jars are designed especially for maximum convenience, economy, safety and display in packaging and merchandising your fruits and vegetables. *Anchorglass* containers are the result of carefully selected and controlled raw materials, consistency in manufacture, uniform distribution of glass, accurate temperature control in annealing, quality control through laboratory tests and regular inspections. They are uniform in height, diameter and finish. The jars illustrated are available in 16 and 28 ounce capacities. But regardless of what you pack there are *Anchorglass* containers in styles, capacities and colors that will completely meet your requirements.

ANCHORVAC*

N CAPS

Use *Anchorvac* N Caps for sealing vegetables, fruits and other food products requiring hermetic or vacuum seals, whether packed hot or cold, sterilized or processed. *Anchorvac* N Caps are nested—it keeps them clean until applied—they take up less storage space—application is faster—coatings and lithography aren't marred. *Anchorvac* N Caps are made in 12 sizes—27 mm for juices and syrups, to 83 mm for wide mouth jars. These caps may be applied by *Anchor* Sealing Machines at speeds ranging from 20 to 625 per minute. Let us tell you more about the advantages and economies of *Anchorvac* N Caps and *Anchor* Sealing Machines.

*Reg. U. S. Pat. Off.

For the BEST in Glass Packaging *it's*

ANCHOR HOCKING

"THE MOST FAMOUS NAME IN GLASS!"

POWERS

NO. 11 TEMPERATURE REGULATOR—*Controls Temperatures of Liquids or Air*

4 PLUS VALUES

1. **OVER-heat Protection**
2. **Valve Stem Lubricator**
3. **Temperature Adjustment has OILITE Thrust Bearing**
4. **Indicating Regulator Available** *

Simple, Self-Operated, Economical —Dependable

Give

BETTER TEMPERATURE CONTROL

and Extra Years of Dependable Service

OFTEN PAYS BACK ITS COST SEVERAL TIMES EACH YEAR

When you want a simple dependable control to maintain a constant uniform temperature install a Powers No. 11 Regulator.

PREVENTS OVER-HEATING—SAVES FUEL and LABOR

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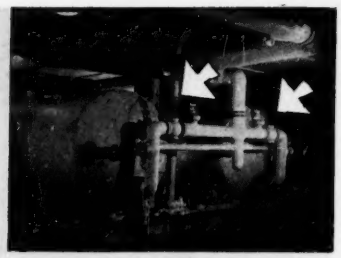

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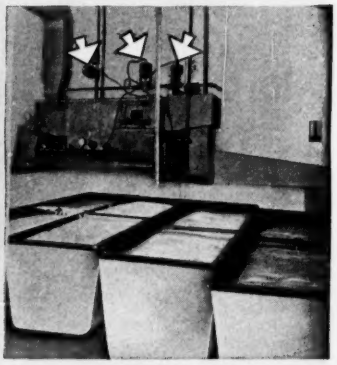

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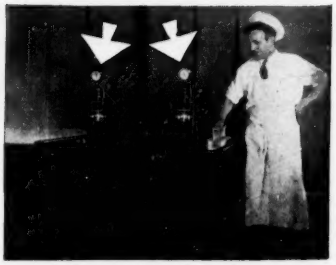

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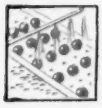

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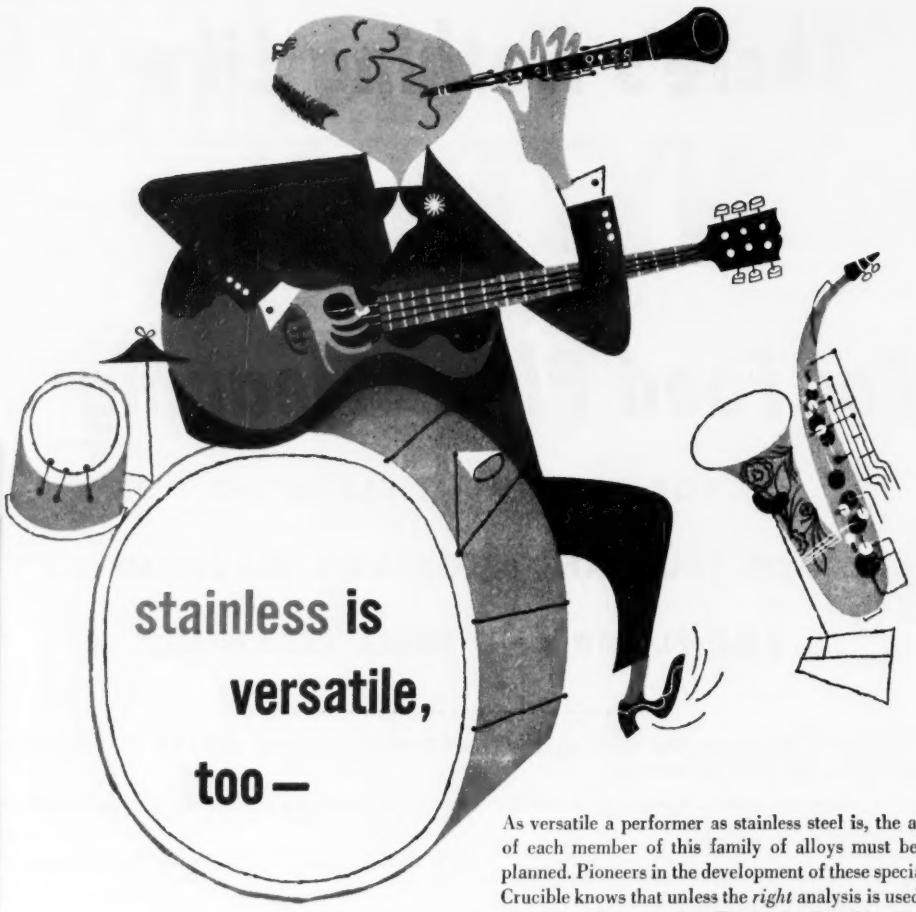

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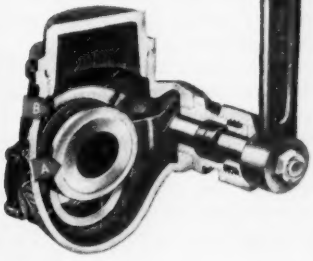

Notice the guide rims (A) of the discs which rotate freely on the guide tracks (B) cast in the body, as the valve opens or closes. This roller action provides a self-cleaning and polishing effect, and also distributes the wear, since the seating position of the discs changes with each closing. Rapid, uneven wear is prevented, and continuous tight closure assured.

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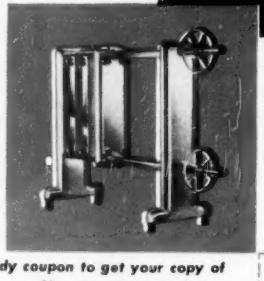

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JUNE, 1950

Food Industries

How To Pick the Brain of Your Mr. FI

This is not an editorial, but a bit of me-to-you talk about our mutual friend, Mr. Food Industries—who is working for you as your technical assistant and partner in progress. Perhaps we have known him longer and more intimately than you and can tip you to some of his qualities which may not have come to your attention.

Mr. FI is a handy guy to have around, because you can consult with him on any one of hundreds of problems that are bothering you. And he comes up with a brand new batch of helpful information and suggestions each month.

Being a systematic sort of person, he carefully classifies his information in an index. So if you are in a hurry for information on a certain subject, you go directly to the point. If, for instance, you have a quality control problem, you find out immediately what your partner in progress knows about the subject. If you need new equipment, tap his fund of information in the Food Equipment News department—and so on.

But between you and us, the way to get the most out of this assistant of yours is to put your feet up on the desk and spend a little time picking his brain. That way you find out every new thing he knows about food processing. Sure, some of it may not be applicable at the moment—but sooner or later you are likely to find much of it useful. Even if you consult with him only an hour or two a month, you will be surprised how much you learn in the course of a year.

Come to think of it, some of the other people he has worked for tell us they have got promotions on the basis of ideas and know-how he tossed their way.

Mr. FI has a gang of people working for him, and they really get around. They cover the food processing industries of these United States, and even keep up with developments in other countries through an international organization known as McGraw-Hill World News.

These legmen are called editors, and they are technical people who understand practical food processing, as well as food technology and food plant engineering. They make it their business to visit modern food plants and research organizations and to keep in contact with leaders in the field. This way they learn about the problems you and others are facing, and they tell your partner in progress how these problems are being solved. These trained legmen also obtain information from authorities in the industry, in the form of feature articles and special reports.

All this wealth of information—representing new know-how developed in 13,000 important food plants and by dozens of research organizations—is available to you through your assistant if you just tap him for it.

This assistant has exclusive new information on your own branch of the industry. But more important, he can tell you what other branches have done to solve problems which are like yours.

As you know, many of the operations and problems are much alike in different types of food plants. Take, for instance, such things as sanitation, materials handling, refrigeration, cooking, mixing, preservation, waste disposal concentration, sterilization and instrumentation. Then, there are all the general factory problems, such as labor relations, public relations and accident prevention. Every day your assistant's legmen come across things which one branch of the industry has borrowed from another.

Well, the black rule below brings us to a halt. And it's just as well, else we might go on and on about our mutual friend. But we shall talk about him some more at another time and place. Each month we shall comment on the specific aspects of Mr. FI's ability to give you information of various types—Practical Ideas, Food Equipment News, New Technology, New Packages and Products, Food Industry News, and what not.

We shall give you all the good tips we can on how to get the most out of your technical assistant and partner in progress.

—F. K. LAWLER, *Editor*

"THOSE in the plan . . . participate in company earnings through payment of dividends."

Four Food Companies OK Profit-Sharing

How their P-S programs work is revealed by Jewel, McCormick, Hormel and Hygeia who report these projects have brought them worthy returns

JOSEPH B. MEIER
Executive Secretary,
Council of Profit Sharing Industries

A system of sharing profits with the personnel, calling for yearly bonuses and individual retirement funds, can add to both employee's and employer's pocketbooks.

That the worker benefits is evident. As for the employer, a successful profit-sharing plan works for him through: (1) Increased production, (2) lower absenteeism, (3) reduced labor turnover, (4) better teamwork, (5) increased employee morale, and (6) improved employee-employer relations.

Here's how four food companies have successfully used profit-sharing in conjunction with their other employee benefit programs.

1. Jewel Tea Has Trusteed Plan

Profit-sharing at Jewel Tea Co., Inc., Barrington, Ill., was first conceived in 1924 by John M. Hancock, then president of the company and, incidentally, the same Mr. Hancock who was junior partner in the Baruch-Hancock team of government fame. He based his plan on two fundamental qualities in the nature of man: Incentive pull and the desire for security in the future.

Mr. Hancock felt that without incentive, man cannot do his best. And that profit sharing provides just that incentive. In short, each year may be better, and each man can do his part to make it better. In contrast, a straight pension plan might be termed static in that it is the same today, next year, or in twenty years. Put it this way: A workmen likes zest in his work, an appeal similar to a game.

The instinct to provide for the future is present in every living form, especially so in the human species. The pension furor today would seem to bear Mr. Hancock out.

Joseph M. Friedlander, vice-president of Jewel, describes his company's profit-sharing plan as it operates in 1950:

"We feel that its name, 'Jewel Retirement Estates,' is important because employees find it easy to refer to. Actually, it has become known throughout the organization as 'JRE.'

"Our plan, requiring one continuous year of employment, is voluntary. Employees contribute from $1 to $5 a week, at their own discretion. This is deducted from their paychecks.

"Before profit is shared, minimum earnings for stockholders are allocated, currently $2.40 per share of common stock. Then profits are shared on the basis of a fixed formula, known to employees in advance. This is necessary for compliance with Government regulations under Section 165 of the Revenue Code. However, the sky is the limit on the amount of profits to be shared. As long as added profits are produced, workers will get their portion.

"An outside corporate trustee receives and administers all employee deposits and handles the clerical work. The funds are invested by two individual trustees and the outside corporate trustee. A statement is given each employee at the end of every year, showing him the status of his account. Literature is also printed from time to time to keep the workers interested in and conscious of the plan.

"There are three methods of retirement under the plan: (1) Company

may retire an employee at 50; (2) employee may retire at his own option at 57; (3) retirement is automatic at 65, except by mutual consent. Workers qualifying and retiring at any of these ages receive the full amount built up in their trust accounts. Those leaving company service prior to retirement qualification receive a reduced amount, according to a fixed schedule based on the full return of their own deposits plus a percentage of their other credits. In the event of death or permanent disability, full payment is made, regardless of age.

"We feel that careful integration of these factors has given the company a successful plan. Our employees seem to prefer building a retirement fund, rather than receiving cash bonuses at the end of each year. As they see their own fund growing larger and larger, their interest in building security increases. It is the same kind of human reaction that a child has when he finally sees his savings start to build up.

"I believe the trust feature of the plan affords the opportunity for people to provide a fuller measure of their own security, rather than looking to someone else (the federal government) to do it for them. I don't believe the average American likes the thought of having the state take care of him when he can no longer work himself.

"The trust feature was added to the plan in 1938. On the average, a member who has deposited $1,200 since the trust was created, today has to his credit about $3,800. Each dollar put in has become a little over three dollars. And many representative employees have accounts ranging from $6,000 to $7,000.

"I would like to recite the growth of Jewel Tea Co. since profit-sharing was started in 1924. In the 25 years we have had it, sales volume has increased 11 times, whereas the average rise for all food chains has been put at 7 times. Of the customers' dollar, we retain less than half the amount retained 25 years ago to cover operating costs and profits.

"Number of employees has tripled since 1924. Individual salary rates are the highest in the history of the company and above those paid by our competition. Assuming business to be reasonably good in the future, employees who retire after a career under profit sharing will enjoy an old age security unknown to those who must depend on tax-supported old age benefits.

"During the last quarter century, earnings of the company have increased over 4 times—while average earnings of all other food chains increased 3 times. Book value of our common stock has increased from literally nothing to over $23 per share. Its market value is 10 times greater than in 1924—more than twice the rate of increase for all Dow-Jones industrial stocks. Stockholders have received a larger percentage of earnings in the form of dividends than have the average of Dow-Jones industrials (79.6 percent against 74.5 percent).

"We do not claim that profit-sharing accounts entirely for this wonderful record. But it certainly played an important part. It is not the complete solution to all the company's problems, and it will not replace other types of incentives. As a matter of fact, we have various cash bonuses and cash compensation incentives throughout the organization.

"I strongly believe that the basic philosophy of profit-sharing is sound, but that each individual company must tailor its plan to its own situation. What will work for one, will not be the perfect answer for another."

2. About McCormick's System

McCormick Co., Baltimore, Md., has a wide variety of employee benefits, divided among two profit-sharing plans and a stock purchase opportunity.

Stock is offered on a purely voluntary basis. Employees may buy it on a liberal weekly basis. Records of employee stock ownership are kept confidential so that this factor will not be given any weight in merit rating or promotions. In short, stock ownership is looked upon as a matter separate from pay or bonuses, but the company always insists upon the right of employees to have the first opportunity to buy stock.

The company has two profit-sharing plans. The first, called the Profit-Sharing Bonus, rewards employees yearly out of current earnings. It is paid at the discretion of the company, which maintains that the best policy is to stay away from a fixed plan with the usual allowances of so much for a year of service. The board of directors each year determines the bonus per employee, in the form of so many extra weeks pay.

The second profit-sharing plan called the Retirement Income Trust Agreement was begun in 1944. Its essential details are outlined in this letter written by President Charles McCormick to the plant workers.

November 27, 1944

Dear Fellow Employees:

Last Nov. 23 we announced to you that stockholders and directors of the company had approved the purchase of pensions through the Connecticut General Life Insurance Co.

At that time it was the desire of the officers and directors to supplement this pension plan with a profit-sharing trust agreement that would make additional funds available for you upon retirement. The stockholders approved such a plan and we entered into an agreement, with the Equitable Trust Co. as Trustee, under which we made certain deposits, and anticipate and expect to make further deposits, for the benefit of those employees who were with us five* years or more as of Nov. 30 of any year in which contributions are made.

Before the plan could actually be placed in effect, it was necessary to obtain the approval of the Salary Stabilization Unit and the Pension Trust Group, both of the Treasury Dept., and we are glad to say that such approval has now been obtained.

If you were employed by McCormick & Co., Inc., The McCormick Sales Co. or the McCormick Warehouse Co., five years as of Nov. 30, 1943, a deposit was made at the Equitable Trust Co. for you. If in subsequent years like deposits are made, and if you were employed with the company five years as of Nov. 30 on which a deposit is made, you will share in the total amount deposited with the Trust Company.

Whether or not deposits can be made every year depends upon the wholehearted cooperation of all our employees and the ability of the company to operate profitably. Inasmuch as this is a profit-sharing plan, we cannot guarantee the amount of the deposit or whether or not there will be a deposit. The amount will be governed by the continued profitable operation of the company.

It should be noted that this retirement income trust invests a sizable portion of its funds in the common and preferred stock of the company. Therefore, those who participate in the plan are indirectly owners of the company's

There Are Qualifications . . .

The four profit-sharing setups described by Author Meier are doing their job well. Their sponsoring companies were notably qualified to make a success of profit-sharing. Not every firm is.

Consensus is that profit-sharing will stand a better chance of being successful if set up under the following conditions: (1) Your present labor relations are excellent; (2) your wage scale is as high or higher than that prevailing in the community; (3) you have an adequate pension program (or plan to tie profit-sharing with retirement benefits); (4) you have a satisfactory wage incentive system; (5) you are reasonably sure you can sustain profits year after year; and (6) your profits are fairly large in relation to the number of employees.—The Editors

stock and, together with the other stockholders, participate in company earnings through payments of dividends.

We sincerely hope that this plan, when added to the other benefits enjoyed by our employees, will more adequately provide for our employees upon their retirement.

Yours very sincerely,
Charles McCormick
President

* Now reduced to 3 years.

To date, McCormick Co. has been able to deposit 15 to 25 percent of net profits before taxes, over a fixed amount to cover dividends on the outstanding shares of stock. Amount deposited for each employee is based on years of service and basic wage or salary. Years of service are weighted from 1 unit for 3 yr. to a maximum of 2 units for 25 yr. of service.

Employees receive total deposits upon retiring at 65, if they are totally disabled, or if they terminate service with company. If they die, their beneficiaries receive equity.

Here is an idea of how much cash an employee would receive, say if he were to retire in 1952: A representative plant employee would get $2,300. An average office employee would get $5,200. And an average salesman has $6,300 in the kitty.

3. How Hormel Does It

Although best known for its guaranteed annual wage plan started in 1931, the George A. Hormel Co., Austin, Minn., has in addition a Joint Earnings Plan and a Profit-Sharing Retirement Trust.

The company has a guaranteed annual wage based on 38 hr. a week. Workers receive additional pay for "production hours" exceeding the actual clock-hours worked (group bonus). Employees also have a guarantee for 52 weeks employment, with 52 weeks notice before layoff.

The Joint Earnings Plan works like this: At the end of the fiscal year, surplus earnings are divided between stockholders and employees. All employees on the payroll at beginning and end of fiscal year are eligible. The amount distributed is computed from gross income after deductions of all operating expenses, except salaries and wages of eligible employees. This amount is divided between stockholders and employees on a proportionate scale. Average extra pay for 1946 was 5 weeks' wages; in 1947 it was 7 weeks' wages; and in 1948, $2,401,585 (7.45 weeks' wages) was distributed. There was a drop in earnings in 1949, hence only 1.03 weeks' wages was paid.

The Profit-Sharing Retirement Trust is non-contributory. Here, the company bases its payment on net profit in relation to net sales (1.002 to 20 percent of net profit, depending on how proportion of net profit to net sales varies from 0.1 to 4.4 percent) or on net profit in relation to sales tonnage. The formula which produces the greater contribution is used.

Individual participation is based on length of service (45 units for 4 yr. service up to 2,000 units for 26 yr.). This participation continues until individual credit reaches either 6 years' base pay or the top figure of $20,000. After that, no additional contributions are made to his credit until 30 percent of participating employees have to their credit an amount equal to 3 years' base pay.

Upon retirement, payments are generally made on a monthly basis for 10 years, although the trustee may pay in a lump sum. Payment is made in full on death. On termination of employment, retirement payments may be lump sum or in installments.

In addition to these plans, the company has group life insurance, accident insurance, hospitalization, and paid vacations and holidays.

Hormel believes in the following basic principles: The worker will respond to the interest shown in his welfare by taking greater interest in his work. In seasonal businesses, every effort must be made to maintain a nearly constant employment level. Extra productivity should be rewarded by extra compensation.

Wisdom of the company's beliefs is attested by reduced labor turnover, lowered costs, and better labor relations. Bearing further witness is the hearty endorsement Hormel's program receives from the United Packinghouse Workers of America, CIO.

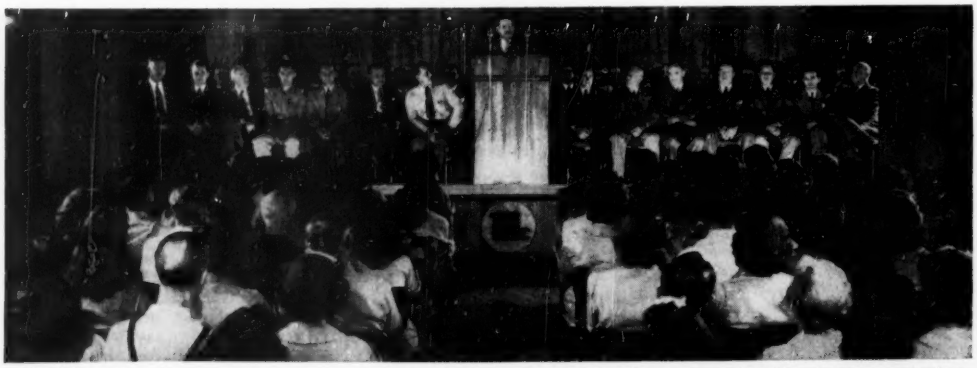
4. Hygeia Has Combination Plan

The Hygeia Milk Products Co., Harlington, Tex., has a combination current and deferred payment profit-sharing plan, and also a contributory pension trust.

The profit-sharing plan sets aside 10 percent of net earnings before Federal taxes and after a 6 percent dividend for stockholders. This is apportioned among all employees with the company for at least one year. One-fourth of each employee's share may be taken in cash. The balance is invested by the trustees, and each year thereafter, the employee receives in cash the interest on the invested sums.

The second plan is a straight pension trust (not tied to profits). It is designed to provide retirement income, and all employees with one year of service are eligible. The employee contributes 2 percent of his salary, and the company pays the difference for an annuity policy. Only first $350 of monthly salary is accounted; maximum retirement income is 35 percent of the $350. Percentage is calculated by totaling 1 percent of monthly salary for each year in the plan, plus $\frac{3}{4}$ percent of monthly salary times number of years in company prior to plan.

In addition to these two plans, the company carries and bears the entire cost of group hospitalization and group life insurance on its employees.



THROUGH company meetings, workers are kept posted on P-S details. This is one of McCormick Co. gatherings.

Facing The Facts On Frozen Concentrated Milk

How Insiders Answer These 6 Big Questions:

- **Next month, or next year?**
- **How store, how pack?**
- **Economic and legal hurdles?**
- **Tech problems baffling?**
- **Simple mix for consumers?**
- **An "un-frozen" dark horse?**

A. V. GEMMILL
Assistant Editor, "Food Industries"

"It is the most exciting project on the horizon right now."

That statement by Minute Maid President John M. Fox has intensified the interest of dairymen and food packers in frozen concentrated milk.

Mr. Fox pointed out, however, that the problems still to be solved—the technical difficulties to be overcome before the product is ready to be marketed—should not be hastily discounted.

From Beatrice Foods President C. H. Haskell: "Our research department has been experimenting with the quick freezing of concentrated milk and has produced what we believe to be an acceptable product, although much work remains to be done on it. However, we have satisfied ourselves that freezing milk for home consumption is practical from a quality standpoint."

Juice processors, dairy companies, other food processors, and evaporator people have been seeking to bridge the gap between idea and fact. Certain persons, reputedly close to the "battle line", will tell you that "at least one of the big companies is already very close to the solution." And this would seem to give an "any day now" prospect to the picture. But on the other hand, there is a more general consensus that no truly final conclusions will be reached for a minimum of 18 months.

The problems involved and the pros and cons which are presented here are intended to bring you up to date—to give you the basis for evaluating future progress.

The point is that the winning of a technological success is not the whole solution. For, it is evident that numerous economic problems would follow in the wake of such a success.

Most obstinate of the technical problems are:

1. Avoiding the cooked flavor when pasteurizing and concentrating the milk, and doing this in such a way that chalky flavors will not develop with the concentrate is held in frozen storage.

A wide range of pasteurizing temperatures (as high as 300 deg. F.) have been explored, together with holding times ranging from 1 sec. to 4 min. at various of the suitable temperatures.

Makers of low-temperature evaporators have concentrated samples at temperatures used in the production of citrus concentrates, and they report excellent flavor in the frozen product. These temperatures are very favorable to churning, however, and this presents a number of additional difficulties. Manufacturers of powdered milks believe that their experience with low temperature evaporation in the production of special dried milks will aid in the solution of the flavor problems.

2. Getting the proper concentration.

Milk has been successfully concentrated and frozen on a basis of 2½ to 1. It will hold safely, reconstitute well, and have good shelf life for many months. But at 3 to 1, the product breaks down in storage and will not reconstitute properly. And at 4 to 1 (the concentration of orange juice) experiments show that it gets during frozen storage.

On the other hand, Mr. Haskell of Beatrice states his company has concentrated milk to "one-third of its original bulk," and packed it "in small cans, similar to those in which orange juice concentrate is sold." The consumer, he says, can restore the milk to its original state simply by adding two cans of water to the contents.

3. Preventing breakdown in storage.

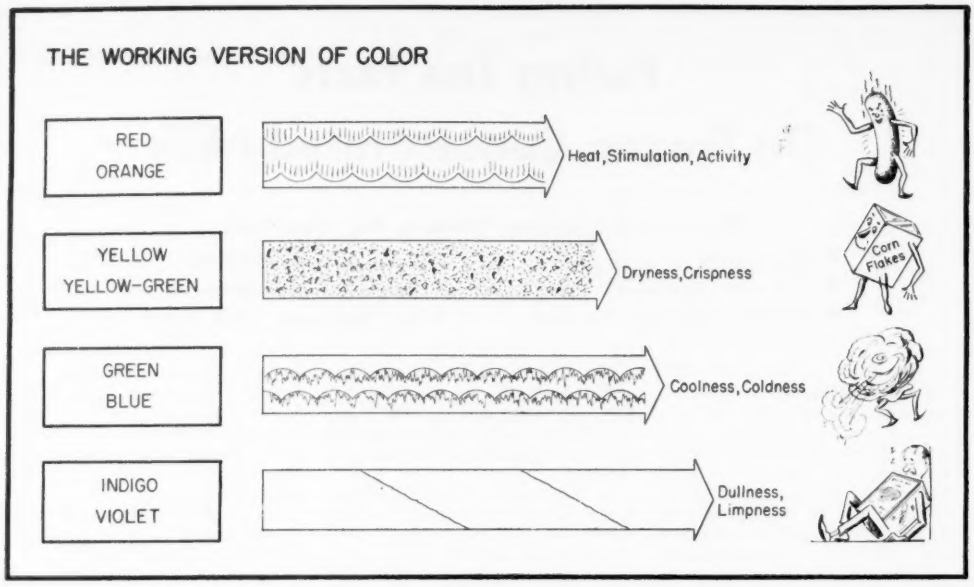
The most consistent defect in frozen concentrated milk has been the rapid deterioration of protein stability so that, after a few weeks in frozen storage, the product tends to separate into curds and whey when thawed and reconstituted. This defect can be lessened by flash heating to extremely high temperatures, by adding salts such as sodium phosphate and sodium citrate, by extremely fast freezing, by very low temperature

(*Turn to page* 184)

Figures Like These . . . Must Be Resolved

	Bottled Milk Per Qt.	Frozen Orange 6-Oz. Can Makes ¾ Qt.	Frozen Concentrated Milk
Raw products	13.22c.	14.01c.	?c.
Receiving, processing (including freezing)	1.40c.	2.00c.	?c.
Transportation	1.51c.	1.00c.	?c.
Containers	0.81c.	2.04c.	?c.
Selling, delivery	4.21c.	6.00c.	?c.
Administration	0.31c.	0.31c.	?c.
Net cost	21.46c.	25.36c.	?c.
Selling price	21.88c.	31.00c.	?c.

These are merely sample costs to illustrate the comparative problems. Figures for bottled milk are based on New York City operations.



Do *Your* Package Colors Hit the Target?

Here are "why's" and "how's" of putting various hues to work—apt tips on tones and practical notions on combinations to do a better selling job

HOWARD KETCHAM
Howard Ketcham, Inc., New York City

Color is the first and most dominant force in establishing the impression a package creates—a power to be put to good use by the food packager.

In three-fifths of a second, the brain records the visual sensation a package induces and relays a favorable, or unfavorable, response to the brain's conscious level. In such instant perception, color plays the leading role.

Color makes a package appear rich or inexpensive, appetizing or repellent, warm or cold, distinctive or common-place. It can direct appeal to the young or old, to women or men.

Color's role in identifying a brand and attracting attention to a product is so highly regarded that companies will spend huge sums of money in court to prevent imitation of their distinctive color schemes. Recently, a major processor of canned soups and a leading producer of canned milk united to seek a Federal injunction preventing a meat packer from adopting a red-and-white label similar to theirs.

Although the court ruled that color combinations are not subject to copyright limitations, it was brought out that any company which merely copies an already familiar and successful color scheme is sacrificing its own opportunity to use color to build sales, prestige, and product identification.

What Color Does for a Package

In food packaging, we have found that color may be employed to accomplish ten specific tasks. It can—

1. Command attention. A wrapper was needed by Williamson Candy Co. to make its Oh Henry bar stand out in crowded candy-display counters. An arresting effect was created by combining bright yellow with lettering and broad border bands in chocolate brown, plus accent notes in red. The eye-catching appeal of the wrapper was pre-tested in a consumer survey.

2. Portray the product. The brown on this candy wrapper evoked the taste of chocolate in the buyer's mind. Similarly, a consumer color-preference survey for a frozen foods processor indicated that 62 percent of women preferred a package with green as the dominant color. Probably so because green vegetables comprise a large fraction of the frozen foods purchased. Incidentally, the same survey specifically discounted the use of Arctic illustrations and frigid colors on frozen foods, and paved the way for substitution of warm colors and food-as-you-serve-it pictures so prevalent on today's frozen food packages.

3. Build brand recognition. It was to retain the distinctive color scheme which created recognition that the soup and milk processors fought the similar label treatment on canned meats.

4. Add eye interest. The Star Market Co.'s bakery package, previously black, was redesigned by our company in fuchsia. This distinctive, standout color did wonders for the former package that had seemed heavy and somber.

5. Promote prestige. A simple test reveals how color can set the quality tone of a package. Put some inexpensive chocolates in a box that is rich-looking and tasteful, and then place some high-quality candies in a

gaudy, glittering box. Watch the reaction when both are offered.

6. Speak a universal language. Some years ago a producer sued to prevent a competitor from adopting a similar green package. He said many foreign-born homemakers could not remember his product by name and simply ordered "the green box" from the grocer.

7. Convince as to function. A sign "Hot Coffee" or "Red Hot Frankfurters" painted in cool blue-green would certainly have little value for a lunch counter operator. In short, there is practicability in selecting colors that will inspire mental associations relating to the function of your product. A complaint today is that many a cereal box is no different in mood from one containing fertilizer. And certain baked bean cans look about as inviting as scouring powder.

8. Have emotional appeal for action. Some colors are action colors which stir impulses. A year-long survey gave evidence that "impulse" purchases in the nation's food stores, accounted for 38 percent of sales. Bearing on this question is a drug store survey that found 27 percent of women make unplanned extra purchases which they themselves attributed to the eye appeal of the display. Of particular interest to food men is the indication that 38 women out of every 1,000 make impulse purchases of candy while in a drug store.

9. Stimulate sales personnel. Advertising managers of packaged-product companies specifically point to sales-staff values of smartly colored items. Says one: "The good looking new package offers a talking point and stirs our sales force to greater effort."

10. Make packages easier to read. For instance, the new bakery box for Star Market Co. has a dignified but clear type-style featuring white cut-out letters clearly visible at supermarket distances. Studies have indicated that, for long-distance vision, white lettering on a black background, black on white, red on white, and green on white are most effective.

In choosing your colors, remember that your food package is not destined to exist alone in a vacuum. Store and store-shelf background, and the color schemes on competitive packages, must be considered. Also, lettering style, package material, illustrations, symbols, and layout. For color cannot do the job alone. Nevertheless, with these elements constant, the package with the wiser use of color will surely move faster and make more dollars.

Your own specific problem remains: "What will be best for *our* package?" In making a choice of colors, tones and combinations, you need two sets of pertinent working facts: (1) Specific qualities of colors, and (2) data on current consumer preference.

Our chart and accompanying tables provide a starter for your appraisal of the various colors. As for consumer preference, when you want to know what people think, you ask them.

And just one final "selling" point: It costs no more to use colors that do the job better.

Maybe your color scheme rates only a "C" . . .

How Different Combinations May Be Scored

A—GOOD	B—FAIR	C—POOR
Scarlet (bright red) and Turquoise (blue-green)	Vermilion and Chartreuse	Scarlet and Green
Scarlet and Blue	Orange and Green	Scarlet and Yellow
Vermilion (red-yellow-red) and Purple	Orange-Yellow and Purple	Scarlet and Violet
Vermilion and Blue	Orange-Yellow and Turquoise	Orange and Purple
Peach (yellow-red) and dark Violet	Yellow and Green	Lime-Yellow and Turquoise
Orange and Blue	Yellow and Violet	Green and Purple
Red-Orange and Blue-Green	Yellow and Turquoise	Turquoise and Green
Golden-Yellow and Blue	Lime-Yellow and Purple	Turquoise and Yellow-Green
Chartreuse and Coral Pink (light, bright orange-red)	Green and Vermilion	
Turquoise and Violet	Turquoise and Blue	

. . . and maybe you've tripped on a tricky shade

How Slight Changes Can Vary The Effect

	Induces↓	But When↓	Mood Becomes↓
Red—dark, pure	Amiability	Grayed	Brutality
Pink—light, pure	Delicacy	Grayed	Insipidity, Frivolity
Orange	Benevolence	Strengthened	Aspiration
Yellow—light, pure	Exultation	Medium darkened	Prudence
Green—medium	Stability	Grayed	Innocence
Turquoise—dark, gray	Profundity	Brightened	Nostalgia
Blue—dark	Sincerity	Lightened	Calmness
Purple—dark	Ceremony	Lightened	Softness

BIRDS EYE'S merchandising director, Howard Lochrie (left), and the author team up here to promote orange concentrate with Martha Deane, Station WOR

Yes, Research Must Go All the Way From First Idea to Final Market

Cooperation of the food company's technologists with production and merchandising departments should be maintained from the "original gleam" until the new food has gained full consumer acceptance

J. L. HEID

Manager, Golden Citrus Juices, Inc., Fullerton, Calif., formerly, director of research, Florida Citrus Canners Co-op, Lakes Wales, Fla.

How can Research advantageously cooperate with Production, Traffic, Advertising and Sales in the introduction of a new food product?

The answer goes well beyond the laboratory—for among the questions that must be considered are:

1. Will the new product fill an existing demand? If not, can a demand be created without excessive cost? Will use of the product conflict with prejudices in the market for which it is intended? Will an extensive educational campaign be required? Are special recipes or home economic promotional work essential? Will consumers like the product *and buy it regularly?*

2. Are the flavor, appearance and food value of the new product good, and will they be retained under ordinary conditions of distribution?

3. Is the product easy and convenient to use? Has it obvious advantages over related products which preceded, or will follow it?

4. Can it be protected against imitation by patent, copyright, or otherwise?

5. Are all necessary raw materials available in quality, quantity and price to permit profitable manufacture and distribution of the new item?

6. Will manufacture of the new product result in waste disposal problems, and if so, how can they be solved? What will be the probability of profitable byproducts?

7. Is the proposed package of convenient size and is it designed to stimulate sales and protect quality? Is it returnable? Does it have, or should it have, a reclosing or reuse value? Will the package have to do most of the selling by display? Is package-cost in line?

8. If pilot plant tests are successful, can full-scale commercial equipment be constructed which will permit continuous, economical, packing of uniform, high-quality products? What special engineering problems are involved in designing large-scale equipment? Are designs calculated to avoid early obsolescence?

9. What is the probable cost of development and what is the overall risk of failure in introducing the product? Does the potential gain warrant the risk?

10. Is general management disposed to invest sufficient capital to provide adequate production facilities *and* properly promote the new product until it is established as a profitable commodity?

11. Will the new product be classed as a staple item or a specialty? Will it be marketed through the same channels as products now in production? And, if not, what channels will be used? What will be the total cost of promotion and sales? Are special handling facilities essential (as they are with frozen foods)?

12. Will marketing of the new product help or hurt the previously established line?

13. What size inventories will be essential, and will they be carried by the producer or distributors? Will consumption be subject to seasonal fluctuation (as is cranberry sauce)?

14. What is the extent, location and permanence of the potential market, and at what price will the new product be accepted in profitable volume?

15. What will be the minimum advertising requirements to create a profitable volume of sales? Will advertising be general, local, point-of-sale or a combination?

16. What will constitute proper labeling to comply with requirements of state and federal food control officials? Should net contents be declared by volume or by weight?

17. What will be the name of the new product? Is it novel, short, easy to spell, pronounce and remember? Is it pleasing in its sound and in its connotation, and does it suggest the nature of the product?

18. Will the new product have special health value or properties which will be valuable in promoting consumer acceptance?

List Isn't Complete

This list is not intended to be complete but rather to indicate the type of questions for which the research, production and sales departments must

find answers before they can endorse a new product and sponsor its manufacture.

It is not proposed to discuss these factors in detail, but it is appropriate to consider testing of consumer acceptance of a proposed product. Tests at an early stage of the development may avoid costly blunders.

The fact that general management, research, sales, production and promotion personnel like a proposed product doesn't guarantee that it will be accepted by the consuming public. There are national, regional, religious and racial variations in food preferences. The South loves blackeyed peas cooked with salt pork; New England rejects this delicacy. One city may like cheese that scents the breath; another city may consider garlic, Limburger or Camembert taboo without being perfumed. In some areas a trace of cinnamon is liked in chocolate ice cream. You may encounter such dubious tastes as ginger in salad dressing, sugar on fried eggs, or peanut butter in everything. Large white eggs will outsell other colors and sizes in New York. Down Mexico way they prefer flat corn "tortillas" to wheat bread.

So—Test Consumers

To determine in advance whether a proposed food product will appeal to a market for which it is intended, consumer tests are desirable and should be conducted cooperatively by the research, sales and advertising departments.

With the problems of developing rations for troops, the QM Food & Container Institute, at Chicago, has studied methods of evaluating flavor by means of taste panels. Other academic, industrial and consulting laboratories have also contributed to our knowledge in this field. It has been observed that individuals who can consistently reproduce their own results in taste tests can only be found by trial. Approximately 40 percent of individuals selected at random have a *good* degree of taste discernment and only 10 percent have an *excellent* degree of taste discernment. Therefore, screening tests are necessary to select tasters who can be depended upon for reproducible results.

Panel tests do not replace consumer surveys. If pilot plant capacity will permit the production of sufficient material, it is usually desirable to extend sampling of the product to consumers. Sometimes tests can be conducted in retail stores or in house-to-house canvasses, while with some products, selected mailings have secured satisfactory results. A combination of methods may be better than placing complete dependence upon any one.

In consumer tests, care should be observed so that true opinions are obtained in relation to package, flavor appeal, presence or absence of prejudices for or against such a product, and other factors which relate to the acceptance of a specific food product. Only by participating in the details of these tests can the Research be in a position to make modifications, when necessary, and recommendations relative to production when, and if, such recommendations are appropriate.

Home Economist Helps

If a new product is intended for home consumption, it is often desirable that the research department be represented by a home economist to participate in demonstrations in retail stores or in other consumer tests and to aid in preparing copy and illustrations for labels and promotional material and to prepare recipes to stimulate use of the product. Specialized training in food preparation, recipe development, nutrition, and food utilization, plus a feminine viewpoint, are valuable adjuncts in enabling research to secure and interpret information and apply it most advantageously to the promotion of a new food.

Author J. L. Held

"The psychology as well as the taste buds of consumers is involved in the acceptance of food products. Unless Research is familiar with all the facts it cannot serve most effectively in the introduction of a new food item."

If a new product is intended for use as a cooking ingredient (such as a seasoning) to be used in hotel, restaurant or hospital kitchens as well as in consumer kitchens, a chef or a dietitian with institutional experience can often aid in stimulating acceptance of the product.

After all departments have endorsed a new product and general management has approved the project, then research and production (with Engineering, if that is separate, or with the engineering departments of equipment manufacturers) work together in developing adequate plant facilities to translate production from the pilot scale to full commercial operation. Skill, experience and shrewd guesses are involved. Since the sizes of batches differ, it is often necessary to vary processing time, temperature and even proportions of ingredients. Rates of mixing, of heating, and of cooling continuously and rapidly must be considered.

In spite of all calculations, some variation ordinarily develops in the process and in the nature of the product. Inactivation of enzymes, which may present no problem on a small scale, may present considerable difficulty in large operations. In dealing with colloids, the size of batches or the volume being processed often affects the quality of finished products. An instant dessert which will set in 30 sec. after compounding in the laboratory may require 2 min. when prepared under factory conditions.

After a process has been developed, the actual production operation is basically a matter of conveying materials through the plant while they are subjected to various unit processes, such as mixing, separating, heating, and cooling. Production management is necessarily concerned with how this conveying can be made simplest, most certain and most care-free. Production cannot be expected to concern itself with sanitation, control, sampling and testing facilities unless Research sees that there is provision of plans. It is, therefore, the responsibility of Research to prepare specifications and organize control procedures, carrying through from the raw materials to the finished products.

In the fruit and vegetable industry, proper harvesting, handling, cleaning and preparation of raw materials is often a critical factor in determining the quality of finished products. In most liquid foods, pumps, valves and lines must be of sanitary design, demountable for cleaning, without dead ends and with contact parts of stainless steel. All equipment which comes in contact with products must be designed to permit cleaning and sterilization.

Sales engineers for equipment manufacturers often contribute valuable suggestions which, if acceptable to research and production managers, will facilitate the economical production of high-grade products.

Production Begins

After a plant is designed and equipment is installed, the initial operation represents a critical stage in the development. Rarely does a process

work exactly as had been anticipated. Breakdowns and delays result from errors in planning and timidity of inexperienced personnel and from improper adjustment or balance. During this period, a cooperative relationship between Production and Research is the only foundation upon which success can be based. Impatience is easy, but harmony is easier when it is realized that every employee is equally eager to get the process into smooth, perfect, routine operation.

Early Supervision

It is usually necessary for Research to supervise processing during this stage, but as soon as satisfactory routines can be established, control of production should be relinquished to Production Management, and Research should concern itself with maintenance of quality.

Research must follow the new product into the warehouse, taking random samples for every possible test, including accelerated aging. Shipments should be followed until delivered to retail markets to see what unanticipated casualties may result from improper handling.

In the early stages of the frozen food industry, many shipments of high-grade frozen foods were damaged due to inadequate handling facilities or lack of education and training of handling personnel. Some frozen foods require lower handling temperatures than others, and railroad employees and frozen food handlers cannot be expected to realize what extra precautions are necessary unless they are adequately coached.

If all the precautions listed in relation to development and initial production have been observed, one might assume that Research might turn the new product over to Sales, with its blessing, and retire to the laboratory. Such an assumption should not be made. Upon Research will fall the burden of minimizing customer complaints and handling complaints which arise in regard to quality, package, label, and recipes. In the early stages of production, deviation from intended procedures are most likely. However, resulting difficulties can be held to a minimum if on-the-spot checks can be quickly made.

Sales personnel, without technical knowledge, have a different viewpoint and may make unpredictable assumptions or representations that may lead to difficulties, unless they are observed and, if necessary, modified. Personnel in all departments are subject to preconceived notions, and it is unlikely that these notions will always coincide.

By accompanying the salesmen and the products through channels of distribution to the ultimate consumer, research personnel can gain detailed, first-hand information regarding unanticipated deviations from what they supposed would occur. During these early stages in the introduction of a new product, mistakes that might retard or prevent repeat sales are advantageously avoided. Only by actual contact with the trade and with customers can research personnel determine the interpretation which will be placed upon labels, instructions and advertising.

Such statements as "Do not refreeze after defrosting", intended by a manufacturer to warn against quality impairment, may be interpreted as warnings of a health hazard. Statements such as "Serve within 48 hr. after defrosting" may be taken as a warning of a health hazard, whereas it was perhaps intended as a precaution for optimum flavor.

Conferences on sales and advertising material, preferably participated in by a home economist with experience in consumer reactions, may make it possible to avoid unanticipated reactions which interfere with sales of a new product with which customers are not familiar. A new customer, intrigued by a striking advertisement of cream packaged under pressure with carbon dioxide being dispensed as whipped cream on a dessert at the table, may attempt to duplicate this performance without practice and, because of unfamiliarity with the valve mechanism, may squirt the whipped cream into the face of the guest of honor instead of on the strawberry shortcake. While this does not reflect upon the quality of the product or the character of the package, it does suggest the advisability of warning customers to practice with the package before serving it at the table.

When foods contain two ingredients, one of which is much more expensive than the other, customers often expect to purchase a product combining the two at the price of the cheaper ingredient. "Cheesroni" combined macaroni and cheese in a very palatable, easy-to-use macaroni, but customers balked at paying the price necessary to make its production profitable.

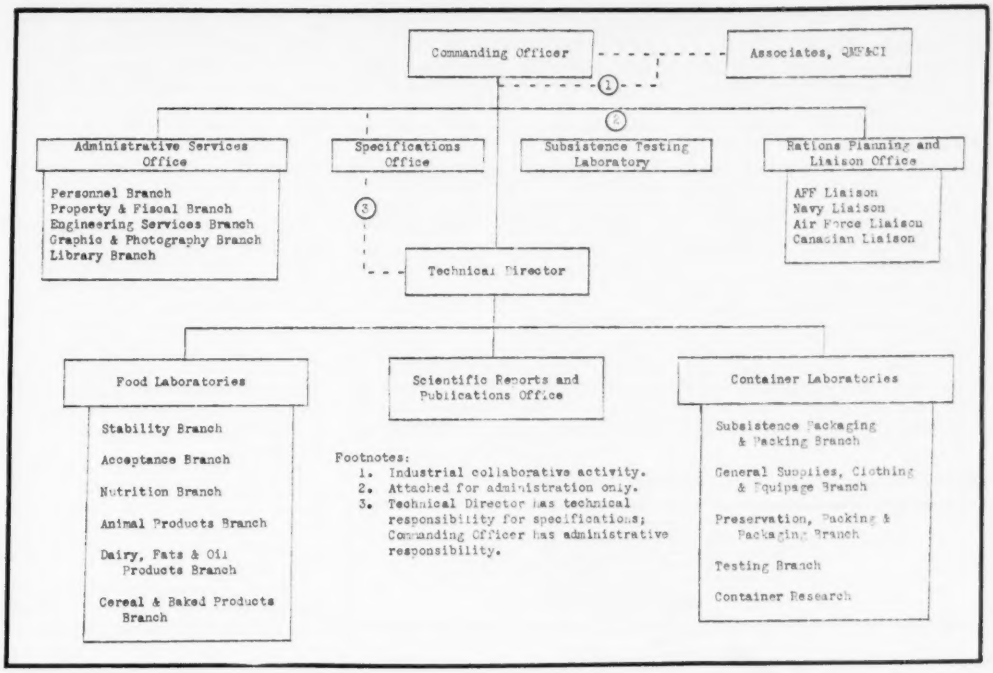
Misleading Reports

The hazard involved when Research depends upon reports from others may be illustrated by an incident in which the research director took recipes to accompany a new product and turned them over to the company cafeteria chef for testing. Truth was that the chef made suitable adjustments in the recipes so that the results were always excellent—but he failed to notify the research director of these changes.

(*Turn to page* 180)

SPECIAL introductory parties provide opportunities for interviews. Here, researchers should take a hand.

CHART I—Organization of QM Food & Container Institute



How to Make QM "Specs" Work

Coordinated effort begins with the drafting of specifications that meet needs of armed forces and are acceptable to food and container industries

MAJ. EDWIN J. SUNDERVILLE,
Chief, Specifications Office, QM Food & Container Institute for the Armed Forces, Chicago.

In presenting typical problems that are attacked by the armed forces in preparing subsistence specifications, a somewhat different approach from that used in other articles in this series is required.

The fact is that while specifications for federal[1] and military[2] procurement of foods and containers are familiar instruments to members of the industries, it still remains that the system by which these specifications are prepared and with which they are coordinated in industry may appear mysterious, unless one looks behind the scenes.

In consequence, the purpose of this article is to lay bare, as simply as possible, the system by which desired military characteristics of food and containers are originally described, coordinated with industry, and written into officially approved specifications after further review and coordination.

[1] Specifications used by more than one department of government. Thus, a specification for sugar might be used by USDA, U. S. Department of the Interior, and Department of Defense.
[2] Specifications used by armed forces alone.

Feeding Armed Forces

Food and container specifications get a thorough airing in this fourth of a series of articles on key problems in the development of foods and containers for the armed forces.

Prepared under Quartermaster direction, the series outlines the general and specific areas in research and operations in which the cooperation of the industries involved are essential if satisfactory solutions are to be found.

With this system firmly in mind, the problem aspects of preparing specifications can be made much more understandable and suggestions for their solution can be made much more realistic.

How Coordinated

To understand the problems involved in preparing specifications for use in procuring subsistence, it is necessary to be cognizant of the agencies that are concerned with each specification. Five groups are involved: Army, Navy, Air Force, government agencies (the USDA, for example), and industry.

The first four groups look at a commodity—hence at a "spec"—from the standpoint of whether or not the desired shelf-life is assured, the nutritional qualities are adequately prescribed, and easy use in the field is fully taken into account. Industry also looks at the specification from this

standpoint, but it is much more concerned with how well or how practicably the inclusion of these desired qualities can be effected.

To emphasize this point, let me pull out of the air a hypothetical problem: The armed forces might desire, for example, a nonmeltable, non-freezable, non-perishable spread for bread of high acceptability. This *is* a problem! Without coordinating the specification written for this item with industry, the attempt to procure it would be as futile as trying to procure green cheese from the moon.

In short, industrial people have the know-how for producing the type of item the armed forces require. They are the people who will have to produce the item in quantity. Also, they are the people who need to know in advance what the specific requirements are in order that they may be prepared to meet those requirements. Just as a contract must be equitable and operable to both parties, so, too, must be a specification.

Our hypothetical butter fails to provide the basis for an equitable and operable contract. Fortunately, such an impossible demand is never made—for the simple reason that coordination with industry has always existed in some degree. At the present time, we have the machinery for very effective cooperation, and our chief problems are those of making the machine run smoothly. Let me describe this machinery:

Organization Chart

Note, in Chart I, the Associates, Food & Container Institute block. Although external to the Institute staff, this organization functions in an informal liaison capacity with the food and container industries. Note further in this Chart the Specifications Office, the Food Laboratories, and the Container Laboratories. These are the military instruments whereby specifications, insofar as armed forces requirements are concerned, are made adequate. In short, internally, we specify what we need. Externally, we learn whether or not what we have specified is tangible, reasonable, practicable and, if not, what can be done about it.

The function of the specifications office is to issue drafts of specifications on the basis of food or container laboratories' technical data, to submit them to Army, Navy, Air Force, and interested government agencies, and, finally, to representatives of industry. This office then becomes the clearing house for comments sent in from these sources and, also, the means whereby suggestions may be incorporated into the "specs."

In some cases essential differences need to be reconciled first. Let me emphasize that the technical advice of the food and container technologists is at all times brought into use in this coordination operation.

That is the general picture. Let us now get down to the points at which coordination with industry occurs in the preparation of the two types of specifications used by the armed forces.

CHART II—Procedure Flow, Military Specifications

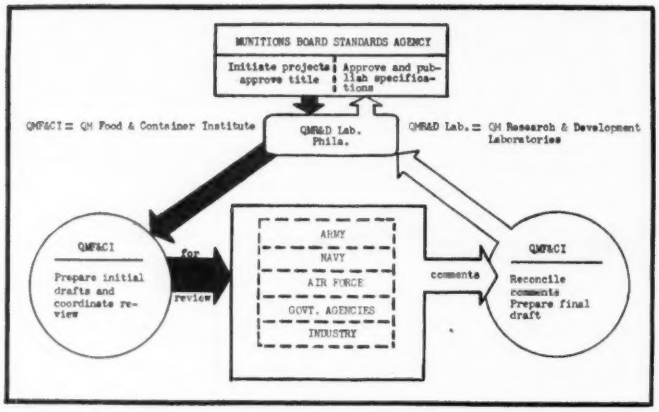
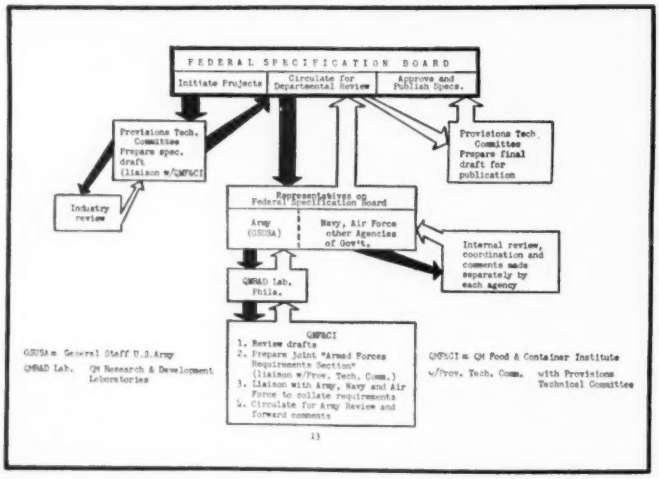


CHART III—Procedure Flow, Federal Specifications


FEDERAL SPECIFICATION BOARD
Initiate Projects
Circulate for Departmental Review
Approve and Publish Specs.
Provisions Tech. Committee Prepare spec. draft (liaison w/QMF&CI)
Industry review
Provisions Tech. Committee Prepare final draft for publication
Representatives on Federal Specification Board
Army (GSUSA)
Navy, Air Force other Agencies of Gov't.
Internal review, coordination and comments made separately by each agency
QMR&D Lab. Phila.
QMF&CI
1. Review drafts
2. Prepare joint "Armed Forces Requirements Section" (liaison w/Prov. Tech. Comm.)
3. Liaison with Army, Navy and Air Force to collate requirements
4. Circulate for Army Review and forward comments
GSUSA = General Staff U.S.Army
QMR&D Lab. QM Research & Development Laboratories
QMF&CI = QM Food & Container Institute
w/Prov. Tech. Comm. with Provisions Technical Committee

13

Specification Flow Chart

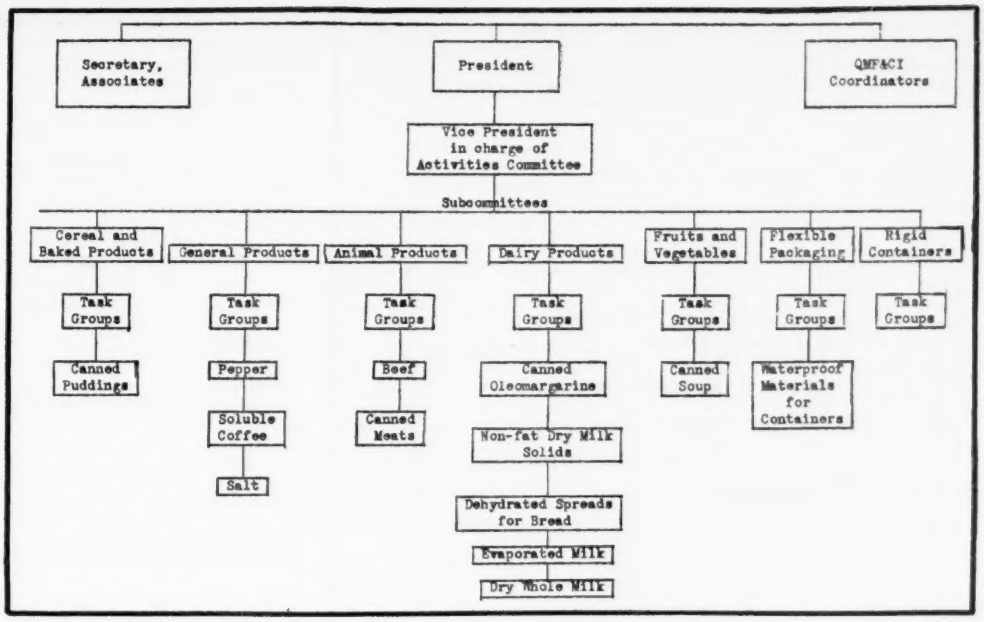
Note, in Chart II, the MIL (Military) Specification Flow Chart. Let us assume that a specification for canned fruit cake has been requested. The initial draft of this specification is prepared in the food and container laboratories. In the operation, they may call upon outside groups, including industry. After the draft is prepared and the needs are set down, the specifications office forwards it to the Army, Navy, Air Force, government agencies involved, and industry.

The following list of a few of the associations and institutions consulted during industry coordination will suggest the scope of business and industrial interests represented:

National Canners Assn., National Restaurant Assn., Fiber Box Assn., Evaporated Milk Assn., Fiber Drum Manufacturers Assn., National Confectioners Assn., National Wooden Box Assn., Soy Flour Assn., American Institute of Baking, Mellon Institute of Industrial Research, Food Research Institute, American Meat Institute, American Dry Milk Institute, Can Manufacturers Institute and Institute of American Poultry Industries.

Industry comments are returned to the specifications office, and any necessary changes and adjustments are made by the technologists of the Institute. The final (or what is expected to be the final) draft is then prepared.

CHART IV—Associates, Food and Container Institute



In Chart III is illustrated the flow of federal specifications. As far as these federal specifications are concerned, the responsibility for coordination with industry for the general commodity section is assigned to a group known as the Provisions Technical Committee. Before the first draft of a specification is sent to the Army and other agencies for review, this committee has conducted the immediate coordination required.

Further coordination with industry may again be needed by the QM Food & Container Institute when Section 7 (specifying requirements of a particular government department) of the the federal specification is being prepared, or in those cases where the QM Food & Container Institute is called upon to assist in the preparation of the other sections.

Associates, Food & Container Institute

We are now ready to examine with closer scrutiny a primary outlet for specification coordination; namely, the Associates, Food & Container Institute, Chart IV. It can scarcely be overemphasized that this is a non-profit organization comprised of companies, corporations, institutions, and individuals who cooperate without compensation with the armed forces in the development of better foods and containers for military use. A working relationship is thus established between key personnel of industry and the professional personnel of the armed forces, thus permitting these two groups to be constantly aware of mutual problems and needs.

Advantages of this relationship are manifold: Coordination prevents duplication of effort in research and development, time is saved as a result of increasing the speed of applying research to products; and realistic specifications—a long-felt need—are possible.

Working Groups

Charts IV and V represent a portion of the activities committee organization of the Associates, Food & Container Institute. A glance gives a quick picture of one of the highly important working units of the Associates organization. The work of the subcommittee is guided by a chairman from industry and a project leader from the Institute. Subcommittees may be divided into further groupings. Each may be assigned a specific problem related to the over-all project. There are 15 working groups at present. The assigned project leader from the Institute works closely with the group chairman and members on the assigned projects. Due to space limitations, we must forego details, but we can reveal that exceptionally fine progress has already been made as a result of the work of this committee.

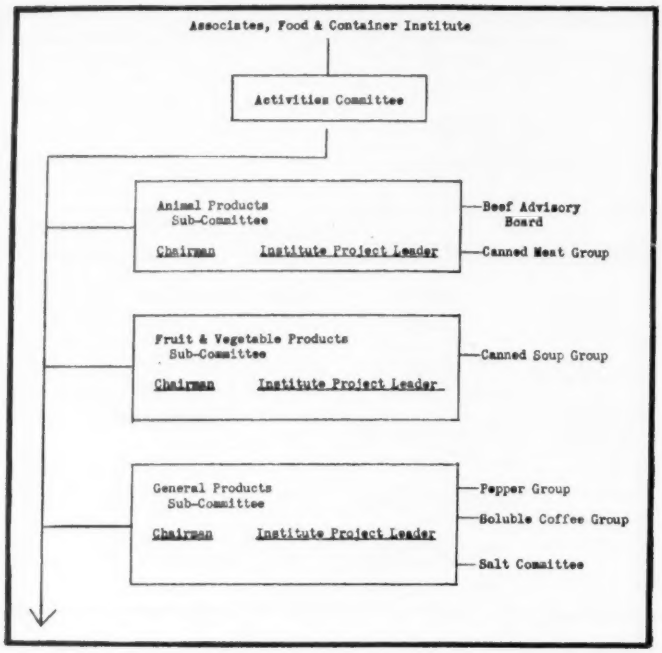
In forming the subcommittees and groups, an attempt is made to appoint people who are in the field of work to which a given item pertains. These people may or may not be members of the Associates. In fact, about one-third of the members of these subcommittees are non-members of the Associates.

Industry Coordination

Coordination with industry takes place when the initial draft of the entire specification is given general circulation among the Associates, the industrial associations, or the individual concerns for review and comment. By having coordination between the Institute on the one hand and (1) the Associates, (2) trade and manufacture associations, and (3) individual members of industry, on the other, the preparation of specifications can be said to be a cooperative effort fully in accord with the best interest of all concerned.

Coordination may go on simultaneously or separately with a later pooling of the findings. For example, in the preparation of the initial draft of the specification for canned soup, the commodity divisions of the Institute contacts the chairman of the subcommittee of the Associates, Food & Container Institute for this special item. He, in turn, appoints members of the Associates, manufacturer or trade association representatives, and/or individual industry representatives to serve on this subcommittee. Again, it is important

CHART V—AF&CI Activities



to note that one does not have to be a member of the Associates to be one of the subcommittee members.

A conference is called at which time the research and developmental work of the Institute and that of industry is reviewed. Both the review of the proposed specification provisions in the light of use requirements and preliminary formulation of the initial draft are accomplished. By operating with such a small group, there is gained a better meeting of the minds in a shorter time than otherwise possible. Opinions and facts are more easily separated, and a clear-cut specification acceptable to industry and to the armed forces can be expected to result. Reservations, implied or expressed, are reduced to the minimum.

Specification Acceptance

In short, when interested and representative groups take an active part in the writing of a specification, its acceptability can almost be taken for granted. The armed forces cannot be fully aware of the problems of the manufacturer, nor can the manufacturer be fully aware of the end-use requirements of the food item for the armed forces unless a common meeting ground of this or a similar kind is provided.

It should be added that the packaging and packing requirements of the Quartermaster for the subsistence "specs" are drawn up in a manner similar to that used by the commodity divisions.

Effective Coordination

There are, of course, problems. No system, however good, operates automatically if human factors are involved. Sought are the solutions which will benefit everyone concerned.

Problem 1: How to make drafts of specifications highly acceptable before sending them out for review by industry. If the use requirements are set forth in the fullest detail possible, it should follow that industry comments will be made more valuable than in those cases where Army requirements are not well understood. When requirements are not well understood, industry comments will tend to make the specification too lax or too precise on various points. A poorly written specification draft that is sent to industry for review will collect many comments that are not applicable. This is primarily an armed forces problem. Steps to improve this situation have been taken.

Problem 2: How to word questions to industry so that they will draw out clear and explicit answers. For some people, perhaps, the form letter that is circulated with the specification can be answered too easily; by an "x" mark indicating mere concurrence, for example. Comments returned on some specifications may vary in amount from one to two pages.

Some valuable, worthwhile, and, at times, amusing comments are received. For instance, one specification submitted for review contained a statement that could have been interpreted to mean that both the product and can should have an acceptable flavor. The comment returned in reply was, "It is bad enough that a person has to eat this product, and now you want him to eat the can." We may wince, but we never reject such pointed remarks. They help us do better the next time.

Timing Important

Problem 3: How to time, most advantageously, the sending out of a specification for review. We are all busy, but we realize that those producing seasonally packed items are, as a rule, too preoccupied during their "busy season" to spend the time that should be given to a conscientious review of specifications. It is desirable to know the best time to submit specifications in order that careful reviews can be made.

Problem 4: How to locate precisely the representative industry groups having interest in a particular specification. Whether they are companies, Associates, or trade associations makes little difference if we can find the ones whose interest can be actively engaged. Direct personal contact with limited groups from industry is preferred—especially when the initial draft of the specification is being formulated. In this way, industry can obtain a better understanding of what the armed forces need and want. Evaluation of accumulated information and the exercise of wisdom and judgment over and above any numerical data accumulated from experiment and experience can be better achieved by these means.

Problem 5: How to contact for review purposes the small companies as well as the large ones. Not always do the large companies give us the best thinking on a specification. Take, for example, the specification for 3-way boneless beef. Since well over 80 percent of this item is packed by small companies for the armed forces, it is imperative that, for the "MIL" specification, contact during coordination with industry be made with small companies and much attention be given to their comments. Comments received from large companies will, of course, be very carefully evaluated, but we should increase our contacts with smaller companies.

Problem 6: How to assure that all qualified groups within a company actually review and comment on the "spec." Research, development, and

production groups have distinct contributions to make, and it is *essential* that each group sees and reviews the specification. For example, much valuable information would be lost to the Institute, and especially to the Industrial Mobilization group at the Chicago QM Depot, if the production department of a company does not mention its production potential, especially in time of emergency. Similarly, much valuable information on tests and test methods would not be forthcoming if the research and development groups within the organization do not review the "spec."

Problem 7: How to obtain a wider survey than is now being accomplished. Companies located in different areas throughout the United States can furnish material which will go far in writing an effective over-all specification and in making it widely applicable. Procurements are made at various points throughout the country. Seafood and carcass beef are two items, for example, where geographical location of the producer plays a big part in the characteristics of the finished item.

Need Ample Time

Problem 8: What amount of time should be allotted for thorough review of the specification. Returns are poor if, during coordination of a specification, review by industry is limited to too short a time. Four weeks has been found to be an average allotment of time for this purpose. What does the industry think about this amount of time as a maximum for review?

Problem 9: How to overcome possible human inertia and antipathy toward modifying the specification. Human inertia tends to block changes of any sort. Specifications are no exception. An attempt has been made to present some specifications for review together with a summary of changes. In this way the changes from the old specification can very easily be seen and the job of review be made simpler for the reviewer.

We have not had much success in preventing a certain antagonism toward "specs" in some categories. Antipathy toward a specification sometimes occurs because of too rigid insistence on precise requirements. Where values in excess of those actually required are prescribed and superfluous tests and the like are required, it tends to arouse the ill-feeling of those reviewing the specification.

A good working relationship with industry insures a better final specification. We are narrowing this gap, but perhaps we should accelerate our progress. We are all responsible for "subsistence preparedness." In time of war, no difficulties are encountered. We must maintain this friendly liaison during peacetime.

Problem 10: How to develop a more precise means of evaluating industry comments. Even though many good comments are received during industry coordination, the final specification will be no better than the evaluation of the comments, with the resultant necessary requisites being placed in the specification. Industry, when called upon, can assist us at this point and permit better evaluation by amplifying its comments.

Industry comments are used in one of three different ways as a result of evaluation. They are:

1. Worked into specifications at the time. 2. Considered not essential or pertinent to the specification for valid reasons and, therefore, not included in the specification. 3. Set up as a basis of problems for further investigation.

Perhaps we are not taking full advantage of industry's willingness to explain how its suggestions can be more fully utilized. Perhaps some of the "problems for further investigation" could be incorporated if we were given fuller details during coordination of the "spec."

It is important, in conclusion, to leave with you the fact that coordination with industry is a continuing process. "Specs" are never final, because advancements in production and in research and development are constantly changing the food and container situation. To denote in the current "spec" the highest points of research and development progress that a given commodity has reached can only be accomplished by a sound workable plan of coordination understood by all.

If I have implemented such an understanding in this article, a worthwhile step will have been taken in effecting full coordination between armed forces needs and industrial technics and capacities for meeting those needs. The next steps are indicated by the various problems I have outlined. They are not insurmountable problems.

Rations, no matter how nutritious, are of little value unless they are acceptable to all members of the armed forces. This phase of the over-all problem of providing combat foods will be discussed next month.

CHART VI—Agencies Contacted, Federal Specifications

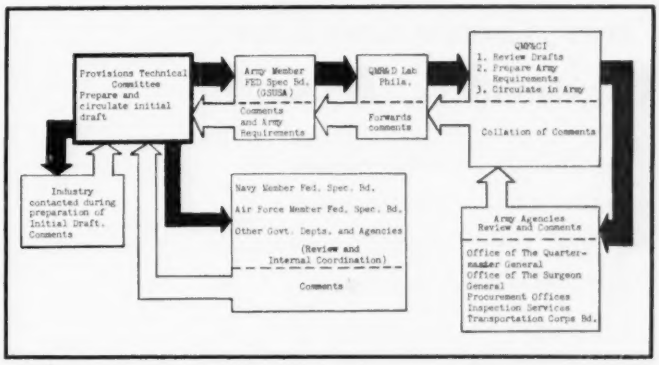
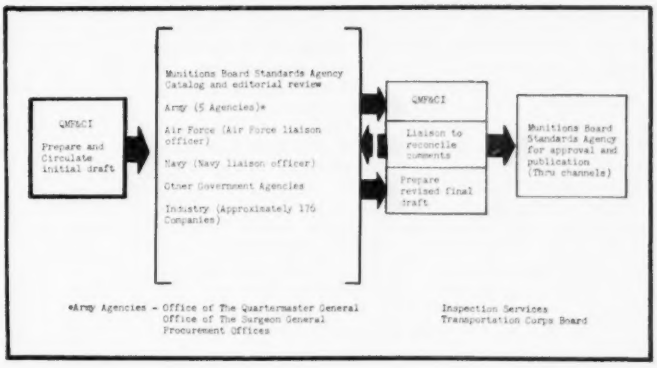


CHART VII—Agencies Contacted, Military Specifications


QM%CI
Prepare and Circulate initial draft
Munitions Board Standards Agency Catalog and editorial review
Army (5 Agencies)*
Air Force (Air Force liaison officer)
Navy (Navy liaison officer)
Other Government Agencies
Industry (Approximately 176 Companies)
QM%CI
Liaison to reconcile comments
Prepare revised final draft
Munitions Board Standards Agency for approval and publication (Thru channels)
*Army Agencies – Office of The Quartermaster General
Office of The Surgeon General
Procurement Offices
Inspection Services
Transportation Corps Board

He just dials cases needed and presses a button, then . . .

HERE, in Haffenreffer's shipping office are seen four master control boxes, flanked by counters for cased goods. Those at top are for empties. System was designed and installed by Production Instrument Co., Chicago.

"Eyes" Control Case Count, Cut Handlings, Up Output

Flow of both incoming empties and outgoing fulls is automatically regulated when brewery pre-sets its remotely recording system

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

Precise regulation of the flow of cases—empties coming in and full cases of ale and beer going out—has been attained at Haffenreffer & Co., Inc., brewers, of Boston, with the installation of a remote electric counting, number-predetermining system. Further, the method saves labor, and it also gears production more closely to shipping. ■ **It is particularly noted that not only brewers but any food processor who handles cased goods can adopt this efficient counter technic.**

Before putting in the system, the Boston company had needed three men for counting outgoing shipments and two for keeping tab on empties coming in. But now, the shipping department gets automatic counts right in its office—through a special wired hookup to photo-electric counting units out in the plant. Thus, the old physical method of tedious, time-taking totaling by the five checkers is done away with.

Since human error involved in checking shipments is eliminated, there are no longer any disputes—as there used to be between checkers and drivers. If, for example, a driver claims he was two cases short, the shipping department can quickly run a check-back on the day's shipments. Moreover, a counter at the end of each loading outlet enables the driver to keep a check on the number of cases going in or out of his truck.

This remote counter-control system permits the shipping department to schedule production so that the major portion of the day's bottling goes directly into trucks. The counters make this possible. By watching them periodically, the shipping clerks are kept informed of the number of empties entering the plant, the number of cases coming off the production line, and those cases yet to leave the filling machines.

The former 5-step handling method has now become a 2-step operation. Handlings by the old way were: (1) From truck to empty bottle storage, (2) to conveyor going into bottling plant, (3) to cased goods storage, (4) to conveyor, and (5) back onto truck. Today, however, by scheduling production in the new manner, the movement is merely: (1) From truck onto conveyor going into the bottling department and (2) back onto truck.

About 65 percent of the production, for example, comprises returnables. And approximately 75 percent of the returnables is run directly from production into delivery trucks. The remaining 25 percent is stacked on the cased goods floor.

Orders for beer in cans or non-returnable bottles, on the other hand, are piled up several days ahead of production. Then, the shipping department purchases the required amount of empties, which are then delivered directly to the fillers in the bottling room and later go back onto delivery trucks. On some occasions, extra production is even loaded from fillers onto trailers several days before delivery.

. . . "eye" beams unerringly tally run until order is complete

THROUGH tabulating station goes case of pints on way to shipping dock. Dotted line alongside illustrates how it has broken beam to "make count." Also indicated is high beam (unbroken) that registers taller cases of quarts.

Equipment to do the job consists of four master control boxes, each of which has a count-presetting knob and an electrically-operated remote batch recorder. There is one of the latter wired to each unloading outlet. Out on the line photoelectric units enumerate, by impulses, the preset quantity of cases and then automatically close a built-in magnetic switch when the predetermined number of cases is counted. The switch automatically starts and stops the booster belt carrying cases past the electric eyes to the shipping dock.

These master controllers, installed in the shipping department office, can be set for any number of cases—from 1 to 9,999. Adjacent to each master control box are three sets of indicating counters. The first set keeps a daily record of all cases (both pints and quarts) shipped on an outgoing conveyor; the second of the quart cases alone; and the third of individual truckloads of quarts. A special single counter keeps track of daily production leaving the brewery on all four outgoing conveyors.

In addition, there are four other sets of counters for the two conveyors unloading empties. The first set records all cases (both pints and quarts) going into the bottling room; the second, all cases of quarts; the third, individual truckloads of cases (both pints and quarts); and the fourth, individual truckloads of just quarts.

How the System Works

To count and deliver an order, the shipping clerk merely sets up the number (of cases required) on the predetermined electric counter dials and presses the start button. The counter then takes over and starts the outgoing conveyor in the plant through an electric relay system.

Each case passing along the conveyor to the loading dock operates a photo-electric unit that registers one count on the remote counter in the office, as well as on a counter alongside the conveyor. When the number of cases preset on the dials of the master controller has passed the photo-electric unit, the controller automatically stops the conveyor, resets itself to zero, and flashes a red signal light, indicating to the shipping clerk that the order is complete.

From the time the start button is pushed, operation of the counter is automatic. Thus, the shipping clerk is released for other duties until the controller signals the delivery is complete.

To insure complete control and to provide a dependable count, each preset controller is equipped with a time-delay relay. This is necessary to prevent the conveyor-control circuit from starting the associated conveyor until the tubes of the actuating photo-electric relay have time to warm up and are in operating condition.

The predetermined number of cases leaving the bottling room may remain the same for batch after batch. Or, it can be quickly changed for each batch by simply turning dial pointers for each digit that is to be changed. Changing the predetermined number is so simple that it can be done while the counter is in operation.

In photo-electric (electric-eye) counter actuation, the light beam that strikes the photo-electric cell must be interrupted and restored to advance the count one unit. In other words, each case enumerated must stop the light beam from striking the photo-electric cell and the space between cases must permit the light beam to again strike the cell.

There are two sets of electric eyes on each outgoing conveyor at the brewery. The top set records the taller quart cases, while the bottom set records all cases (both quarts and pints).

A power-delay unit automatically stops the conveyor when cases are being delivered too rapidly from production for truck loading. Then, when the conveyor from electric eyes to unloading platform is clear of cases, the conveyor automatically starts again.

"Rolling" Cream for Street Corner Coffee Drinkers

THESE HIGH FAT PELLETS for coffee vending machines, equivalent to half and half cream and milk, are ground together with coffee and sugar (also pelletized). They are said to dissolve completely, and not oil-off or "feather."

Tailor-Made Dry Milks

The Powders Are Now Patterned for the End-Products

Characteristics built into them produce special effects—"milk" flavor in chocolate, stability in custards, water absorption in ice cream

A. P. STEWART
Research Administrator,
Golden State Co., Ltd., San Francisco

Today, quality minded food processors are reaping wide benefits with striking new milk powders—those specially "tailored" to produce superior end products.

The special characteristics to insure these maximum benefits must be developed during the product's manufacture. For instance, the high heat treatment that makes a dry milk valuable to the baker renders it unsuitable for the manufacture of cottage cheese and buttermilk. Moreover, dry whole milks used in chocolate must have characteristics different from those for making caramels.

Recent figures published by the American Dry Milk Institute reveal some interesting end uses for dry milks. Of the total domestic, nongovernment, consumption of powdered whole milk, one third was used by candy and chocolate manufacturers. Almost that much—30 percent—was used by the baking trade, while 13 percent was packaged for home consumption, 7 percent was employed by baby food manufacturers, and the remainder went to institutions, soup manufacturers and other commercial users.

Similarly, in the case of nonfat dry milk solids, 64 percent was used by the baking trade, 19 percent by dairies, 8 percent in meat processing, and the remaining 9 percent for candy manufacturers and institutions. Only ½ percent was packaged for home use.

Even within the same industry, different characteristics are required in dry milks. For instance, one might assume that since chocolate and caramel are both candies, the same powdered whole milk would be suitable for both. In practice, however, this is far from the case. The "milk" flavor so desirable in chocolate requires specially processed milk and milk powder in which the flavor is readily available for blending with that of the chocolate. Unusually low moisture content is also desirable since it makes processing easier and gives better appearance in the finished product.

In the manufacture of caramels, however, the very high temperatures used, plus the high sugar concentration, render normal whole milk powder insoluble, giving the caramels a grainy texture. Consequently, there has been preference for sweetened condensed, or evaporated milks, which are stable to high heat and high sugar. But,

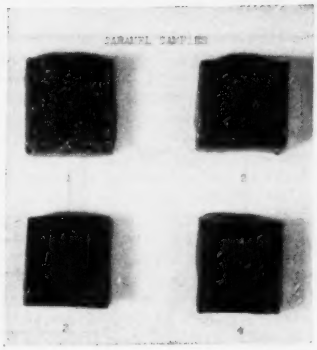
there are numerous advantages in the use of milk powder over evaporated or condensed milks in candy making. Keeping quality of dry milk surpasses that of sweetened condensed, and, although evaporated milk equals powder in keeping quality, powder is easier to handle.

In our Golden State Co. laboratories, we specifically studied the action of condensed and evaporated milks during the processing of caramels, with particular regard to the milk's stability. Those stability properties were then carried through to powder. Result was a powdered whole milk that is stable at high temperatures during processing. Incidentally, this product is suitable for the manufacture of canned soups, where its high heat stability withstands the sterilization treatment.

Custard Mixes Pose Problems

For custard manufacturers, a powdered whole milk compatible with the other ingredients was necessary. When made with normally processed powdered whole milk, custards tend to break down and become watery by the time they reach the grocer's shelves. After a careful study, a powdered whole milk was developed which contributes to the custard's smooth, firm body. This powder does not foam excessively when mixed with water, has good solubility, and a fine flavor.

By another processing method, a low-fat (1.7 percent fat when reconstituted) powdered milk was developed which contained additional vitamins. This was designed especially for the export trade.



CARAMELS made with regular dry whole milk (1) become grainy. But with specially processed whole milk powder their texture (4) is similar to those made with sweetened condensed (2) or evaporated milk (3).

In processing this product, retention of the nutritive elements must be assured. For instance, heating the milk excessively in the presence of air, and use of equipment containing copper-bearing alloys, contributes to destruction of vitamins.

Drying Process Speeded

Included in our development work has been an extensive study of how to preserve the nutritive value in milk. In this study, we learned the great importance of processing milk as soon as it reached the plant. We developed continuous flow procedures and initiated them in the industry.

Take, for example, evaporation of milk. By the batch method in vacuum pans (prior to drying) it often took several hours. In the continuous-flow method, milk remains in the evaporators less than 2 min. This process, coupled with a specially designed dryer, also eliminates localized overheating and makes for an end product of greater solubility and one that retains the flavor of the original milk. To bring about maximum vitamin retention, all heating and evaporating equipment was enclosed, and stainless steel is used exclusively.

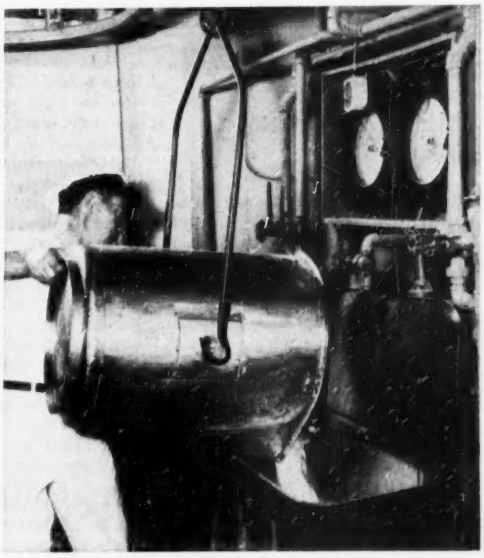
This process of quick evaporation and special drying has helped in the development of a powdered cream, of excellent flavor and high solubility, now used by a distributor of coffee-vending machines. A further development was the production of pelletized cream (see photo) for use in a different type of coffee vending machine. Greatly improved methods of packing in inert gases (nitrogen and CO_2) have more than doubled the keeping qualities of canned milk products containing fat.

There were, however, major problems when developing technics for producing powdered cream for coffee.

(*Turn to page* 181)

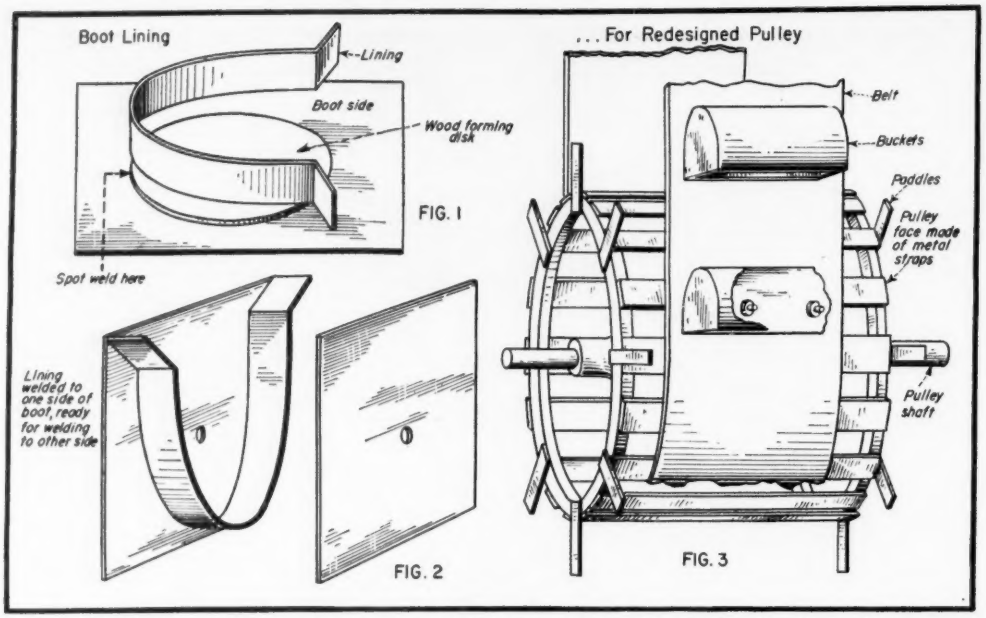
For Either Small or Large Operations

RAUCHERS, father and son, in Star Bakery, San Francisco, use dry milk solids in their products.



IN LARGE BABY FOOD PLANT, specially processed powdered whole milk is mixed with other dry ingredients.

How Transition Members Are Built



FIGS. 1, 2, 3. In elevator boot construction, plywood disk (Fig. 1) is used in forming sheet liner. Formed sheet (Fig. 2) is welded to one boot side, then other. In Fig. 3 are seen details of revamped bottom pulley.

Save *More* In "Moving Those Dries"

How unit-conveyor idea—carried out with special transition devices—can bring your dry materials handling cost down to a new economical low

W. A. REED
Plant Engineer,
Taylor Reed Co., Glenbrook, Conn.

PART I

It's really quite easy to get greater line flexibility in dry bulk materials handling—and with even less labor, and still more savings. The answer is use of bucket elevators and screw conveyors in the unit way.

Such conveyors can be readily built and operated as individual, compact, quickly moved machines. Here is the story and the "how-to" details:

In plants processing the same products from the same ingredients year after year, the continuous conveyors are commonly built into fixed production lines, based upon extensive engineering studies.

But such movers need not be limited to the fixed production line alone. They can be equally effective when used as unit conveyors, particularly in those plants which produce new products and have varied processing. Accordingly, a change in processing will require only the labor of moving some of the conveyors and other machines and possibly the fabrication of a few transition sections.

In the present discussion, a unit conveyor is considered as either a vertical bucket elevator or a horizontal screw conveyor, complete with drive, bearings and electric controls, so made that it will operate in conjunction with other machines or conveyors. Here in Part I, we will first deal with the economies of unit conveyors and then cover specific operating details on bucket elevators. Part II, in a subsequent issue will detail the story on screw conveyors.

Unit conveyors have many advantages, few disadvantages. They are low in first cost, as evidenced by the installation of a 20 ft.-high bucket elevator with adequate operating mechanism for a cost of approximately $2,000.00. A 10-ft.-long unit screw conveyor, engineered and installed by a contractor, costs in the neighborhood of $1,000.

These conveyors are long on wear and slow on obsolescence. They can be amortized over a period of ten years or longer. Granting the labor cost of an operator is $2,500 per year, a capital expenditure of several times this amount for unit conveyors accordingly would be quite justifiable to replace a single operator.

Unit conveyors are low in overhead, operating cost, and maintenance. Each conveyor has its own motor and reduction gear. These seldom need attention more often than once a year. No more frequent attention is required for the rest of the conveyor system. Other labor requirements are also low, being limited to that necessary to handle raw materials and guide ingredients. A unit conveyor system should only be considered when there are two or more employees in the processing room. With any mechanical

devices, one man should always be on hand during operations.

Unit conveyors conserve space as well as labor. A processing arrangement often used is to elevate materials to the top floor of a multi-story building and permit the materials to flow by gravity from one step in the process to the next, until completion.

When these conveyors are employed, the process can be on one floor, often in one room. Materials are fed in at the top of processing machines, collected at the bottom, and fed to the next machines until the process is finished. Plant personnel does not have to run from floor to floor to operate machines or check on the flow of materials. A process built around the conveyors is very compact and requires surprisingly little space when the layout is well engineered. Single-floor operation is also advantageous in continuous mixing. When materials fall through the air by gravity they tend to un-mix. The lighter or smaller particles do not fall as fast as the heavier or larger particles. This condition is minimized in a one-floor system.

Regardless of how close existing machines are located together, if a process change is necessary, or a new product to be added to the line, the additional or changed equipment can be located in the nearest convenient place. Conveyors leading to and from the additional set-up determine its location in the sequence but not in machine position. The distance materials travel in conveyors does not increase the labor costs. Additional current consumption will be hard to find in any plant electric power bill.

If the product is seasonable, or if production is increased or decreased, the changes can be handled with the minimum shift in the number of employees. It is even possible, with the addition of a few storage bins, to avoid extra shifts when production is at a peak.

Use of unit conveyors fits the trend of more horsepower per employee, higher wages and continuous employment. With fewer and higher paid employees there are less accidents. Though some maintenance and a minimum of cleaning are necessary, the climbing that has to be done is on ladders and cat-walks—not overly hazardous when properly guarded. Unit conveyors also avoid the trouble of unintentional mix-up of ingredients and products. There is little chance of mix-up with these units, because all ingredients have their separate ports of entry and exit.

Cleanliness Aided

Such a conveyor set-up is a closed system and may be made dust tight, or very nearly so. This makes for a clean plant minimizing dust and dirt contamination of products. Unit conveyors limit the need of storage space around a process, therefore machines may be placed close together. Thus, being compact, there is little space for odds and ends to collect. There are also fewer people to contribute to a possible mess. Result: Better housekeeping.

Bucket Elevators

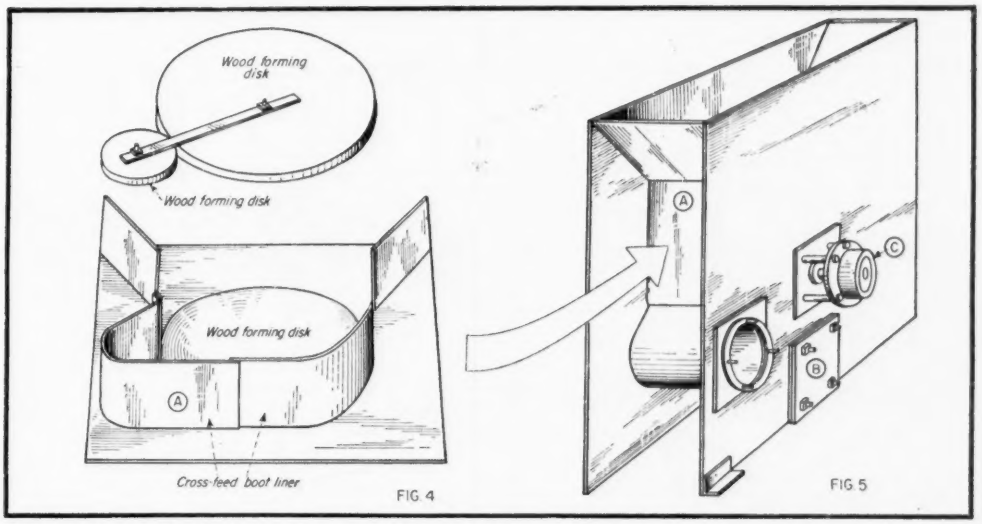
The functional part of a bucket elevator is a long continuous belt with scoops or buckets attached. The buckets are fastened on by bolts that have extra large heads (otherwise the bolts will pull through and quickly end the belt's usefulness). Sufficient space between buckets and belt must be provided so that buckets can round the pulleys without touching the belt. Insufficient space causes excessive belt wear. Placement on the bolts of washers, between belt and buckets, provides ample space.

In operation, material is scooped up in the bottom section of the elevator (the boot), and discharged by centrifugal force and gravity as the buckets round the top pulley.

There are a number of ways by which material can be fed to the conveyor buckets in the boot. Conventional way is to feed material to the buckets either from the end or side, at a point where the buckets have left the lower pulley and are on their upward travel. Filling the buckets as they rise is more effective than scooping up the material from the bottom, since buckets must travel fast enough to discharge material by centrifugal force and gravity at top.

There are however, two disadvantages to high infeed to the buckets: Either all infeed conveyors must be at

Cross-Feed Boot Liner Is Easy To Construct



FIGS. 4, 5. How another boot liner—for cross-feed—is made. Two wood disks (Fig. 4 top) are used to form liner (A) for cross-feeder. Fig. 5: Here is completed liner in place in boot (A). Clean-out door is seen (B), and shaft bearing (C).

a height of at least 3 ft. from the floor or, the boot must be sunk into the floor, making it inaccessible and hence very difficult to clean.

It is possible to feed into a boot from a screw conveyor directly under it. But this method is not recommended, for it adds to the difficulty of cleaning and of rearranging equipment in case of process changes.

Most practical and efficient method of feeding is from the side at the bottom on a level with a tangent to the lowest point of the swing of the buckets around the bottom pulley. When this location is used, it is necessary to make certain changes in the construction of the boot and to redesign the bottom pulley.

A lining must be welded in the boot to outline the travel of the buckets around the bottom pulley with a $\frac{1}{2}$ in. clearance. If there is a greater clearance, material will lodge-in and be wasted when the boot is cleaned.

This lining is not difficult to construct. One side of the elevator boot is laid on the welding table, outside surface down. To the upper surface of the boot a plywood disk is attached. The disk is turned from $\frac{3}{4}$ or 1-in. plywood with a diameter as desired for the boot lining (see Fig. 1). Boot side and disk are clamped together by two iron plates bolted through the pulley shaft hole and centered at this opening.

A sheet of 14 gage metal is cut the width of the inside of the boot and to the length required for completely lining the boot. The sheet is held upright against the wood disk with center of the sheet at the bottom of the boot. It is then spotwelded. The sheet is then bent to conform to the lower half of the disk and welded in place. From the mid-point, the lining follows the belt travel vertically until bent at 45 deg. near the top to meet the boot ends, to which it is welded when the boot is assembled.

Once the lining is welded to one side (see Fig. 2), it is a simple matter to position the liner and other boot side and weld in place. Lining a boot greatly increases the elevator's efficiency.

Features Redesigned

The pulley is redesigned so that its face is at least 3 in. wider than the belt. The face (Fig. 3) should be made of bars of steel or straps about $1\frac{1}{2}$ in. wide with at least a $1\frac{1}{2}$ in. space between each bar. Surface of the pulley formed by these bars should not be flat but raised slightly in the center to cause the belt to ride the middle and prevent belt-wander at the pulley.

Eight or more strap-iron paddles are welded to each side of the pulley, extending out as far as the outside rim of the buckets. These paddles stir the material at the sides beyond the travel of the buckets and pile the material high enough in the boot so that the buckets moving upward are loaded as they leave the lower wheel. Because of this stirring, the slatted type pulley face is important. The broken pulley surface prevents material from building up on the back of the belt; the open spaces between the belt and pulley edge provide ports through which material can issue.

An elevator boot can be fed from the side (side-discharge feed conveyor, with screw at right angles to elevator pulley shaft), or fed across and through the boot. If the boot is side fed, it will have two identical openings on opposite sides. The screw will feed into one, the other will be closed with a clean out door. Every boot should have at least one 12 in. sq. clean-out door.

If fed by a cross feed conveyor (conveyor parallel to the pulley shaft), the screw should be located so that its shaft extends through the boot with minimum clearance between elevator buckets and screw flights. The screw conveyor is not positioned beneath the elevator pulley shaft but to the side, with the bottom of the screw flight on a level with the buckets at the lowest point in their swing. When the feed is thus placed, the cleanout door may be located directly below the pulley shaft at the height of the liner. This is the most advantageous location for cleaning.

When the cross feed is used, the boot lining must conform to the path of the buckets and the screw flights as well. To extend the lining to include the screw flights, the procedure is the same as for making the liner. A wood disk is turned with the diameter needed for the lining around the screw flight. When this disk is located the correct relative position to the boot liner disk, the two are secured in this position by

Effective Belt Tightening

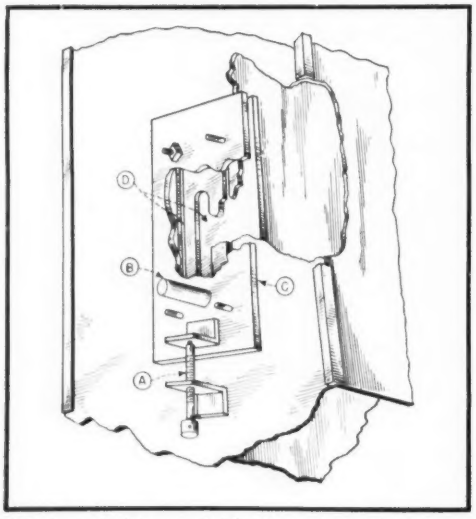


FIG. 6. Belt take-up sketch shows threaded jack (A), pulley shaft (B), plates (C), and slots in housing (D).

And Discharge Arrangement

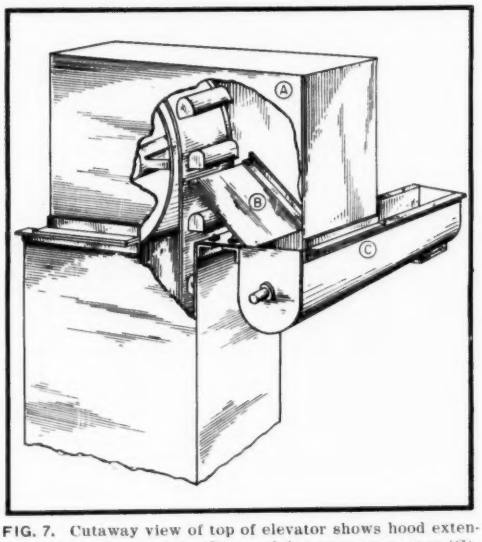


FIG. 7. Cutaway view of top of elevator shows hood extension (A), discharge plate (B), receiving screw conveyor (C).

boards or metal straps and bolts (Fig. 4). The boot lining may be made first and a section cut away for the screw liner, or both can be assembled at the same time.

The intermediate section of a bucket elevator is usually an inclosure equipped with doors for cleaning. This center section may be of either single or double construction. When the housing is of single construction, the belt rises and descends in the same tower. The latter must be wide enough to permit ample clearance on the sides for belt-wander and the in-and-out motion of the buckets due to belt sway. Since clearance must be kept at a minimum only at the bottom to prevent waste, space in the intermediate section should be ample.

In the double construction there are two towers or housings. The belt rises in one, descends in the other. This construction is slightly stronger, but for most food plant uses it is not necessary.

The power drive of the elevator is through the top pulley. It could be in the boot section, but belt slippage would then be much greater. With the power drive at the top, the weight of the belt and the buckets causes sufficient friction to make chances of belt slippage remote.

Top section also carries the belt tightener or take up. The easiest way to tighten the belt is to raise the top pulley. It is important that the belt take-up be dust-tight, hence a specially constructed device is necessary.

There should be two vertical slots in the upper housing through which the pulley shaft extends. Inside the housing next to each slot are plates

(*Turn to page* 180)

Midget Doughnuts Enter Snack Field

Small, low-cost machine fries them in retail outlets. Special retarded mix is used

SILVER DOLLAR-SIZE doughnuts, made in a new low-cost machine with a specially retarded wet mix, are now being introduced nationally after test-marketing in Los Angeles.

Made fresh on the retailer's counter, these small, snack doughnuts, selling at 10c. a doz., are reported to be finding ready consumer market. Surprisingly, they do not cut into regular-size doughnut sales as much as might be expected. Rather, they are eaten as snacks, much in the manner of potato chips and pretzels. A record 3,200 doz. were sold in one day at Gimbel Bros. department store in New York City.

Story of the development goes back three year when Tom Thumb Donut Corp., Hollywood, Calif., completed its small machine that can produce up to 3 doz. 1½-in.-dia. doughnuts per min. in a retail outlet. Problem was to develop a mix that could be retarded so that it would remain fresh in the wet stage for a few days. Then the mix could be wetted at a central location and distributed to retailers in ready-to-use containers. Pillsbury Mills, Inc., then became interested in the sales possibilities of the small doughnuts and, after extensive laboratory work, came up with the required mix. The retarding agents are incorporated in the dry mix. On receiving it, the doughnut company adds water and ships it under refrigeration in 10-lb. containers to the retailers. The mix can be kept this way for three or four days at 65 deg. F.

The doughnut machines are furnished to retailers by the company. Operators are trained by either retailer or company.

Measuring a little under 2-ft. square, the machine can be regulated for one, two or three dozen doughnuts per minute. These are hand-packed in cellophane bags and sold at the counter. Company says if sales warrant it, they will develop a machine for wrapping.

Frying operation is as follows. Wet mix, still in 10-lb. container, is placed in rack attached to a patented doughnut former. Bottom of the container is perforated so mix can enter former.

Doughnut former extrudes mix, in shape of rings, onto a perforated tray submerged in hot frying oil in a spiral porcelain canal. Doughnuts are carried along in the 390 deg. F. cottonseed oil shortening, the shortening being circulated by a pulsator. Halfway around the spiral, a mechanical paddle automatically inverts the doughnuts. At the end, a conveyor carries the doughnuts into a pan, from which operators hand-pack the doughnuts. Sugar can be shaken on the doughnuts in the pan, if desired.

An activated carbon deodorizer permits only the doughnut fragrance to pass into surrounding air. Machine operates on 110v. a.c. and need merely be plugged into regular store outlet.

HERE'S unit. Under 2 ft. sq., it turns out up to 3 doz. 1½-inchers a minute.

NINE-MAN CREW completes digging, washing, packing, and loading of sweet potatoes in Maryland. Just six days later, these sweets were sold to consumers in Oakland, Calif., grocery.

"Go West, Young Yam"

With a surplus of sweets in Maryland, none in California, 30,000 lb. were loaded on trailer for first long haul of its kind, reaching Coast 100 hr. later

AN ENTERPRISING grocery store chain, which had plenty of sweet potatoes for sale at its eastern outlets but none at its western stores, late last year shipped a load of 500 bu. clear across the continent by motor truck in 100 hr.

The starting point was Salisbury, Md., and the destination, Oakland, Calif. with 3,124 mi. of American highways in between.

Long haul west-to-east motor truck shipments of oranges, lemons, grapefruit, and other out-of-season fruits, as well as vegetables, were considered unusual several years ago, yet now are commonplace. But the reverse-direction shipment of the once lowly-considered sweet potato is claimed to be the first of its kind ever made.

In this new venture the companies involved were the Easwest Produce Co., an affiliate of the Safeway Stores, Inc.; C. R. Hayman & Sons, brokers of Salisbury, Md.; B. Frank Adkins, grower near Salisbury; and Glasgow & Davis, contract motor carriers, also of Salisbury. Safeway had been selling the Maryland sweet potato with good success in its stores in the east and wanted to give the same item a trial in the west.

Accordingly, Russell J. Burress, branch manager of the New York City office of the Easwest Produce Co., ordered the load of sweet potatoes delivered to the Safeway Stores, Inc., in Oakland. The potatoes were dug on the Adkins farm, brought to the packing houses of C. R. Hayman & Sons in Salisbury, washed and packed in bushel baskets, put under the Lee & Charles brand label, and finally loaded in the Glasgow & Davis trailer for shipment. All of this operation was accomplished in one day, Sept. 21, 1949.

The trailer left Salisbury on the day the loading was completed. In only 100 hr., or approximately 4 1/6 days later, the load arrived in Oakland in good condition and was put on sale in the Safeway stores on the morning of the sixth day.

Concerning the economics of the movement, the motor carrier rate was $4.17 per cwt. plus the 3 percent transportation tax. The latter is 12½c., thus making the overall cost $4.295 per 100 lb., or 4.295c., per lb.

If the shipment had gone via the Pennsylvania Railroad (the only line serving Salisbury direct) the rate would have been $2.01 per cwt. plus the 3 percent tax of 6c., making the total cost $2.07 per cwt. or 2.07c. per lb. And transit time by rail would have been approximately 11 days.

Comparing the motor vs. rail cost and the time in transit, it is seen that the motor method costs about twice as much but delivers the load twice as fast.

If time of delivery is the most important factor, it is apparent that the choice goes to the motor method. But at more than double the cost, the question of profit or loss enters the picture.

If an increased distribution cost of over 2c. per lb. leaves an adequate profit on the sale of the item, the choice may still remain with the motor method. With sweet potatoes selling at 15c. per lb. or 2 lb for 29c., the shipping cost of 4.295c. per lb may be well within reason.

Of course sweet potatoes are also grown in California, but an off-season in that region last year made this shipment from the East feasible. Future loads to the same destination depend largely on supply and demand at both points.

In any event, the big talking point remains—ability of the motor carrier to beat the time of rail delivery, regardless of distance. The run was made by a GMC diesel tractor fitted with a sleeper cab and manned by two drivers, one of whom drove while the other slept enroute.

Covering 3,124 mi. in 100 hr. running time gave the tractor-trailer combination an average speed of 31.24 mph. Maintaining such a speed, day and night, the unit just "ate up" the miles. Passing through eleven states, the route followed good highways all the way across the continent.

Loading Figures

The net payload carried was 30,000 lb. while gross weight of the tractor, tandem-wheeled semi-trailer, and the payload was 55,000 lb. As for axle loadings, there were 6,000 lb. on the tractor front axle, 17,000 lb on the tractor rear axle, and 32,000 lb on the two- semi-trailer axles, at 16,000 lb. each.

The above loadings were legal, according to state highway laws, in all except one of the states crossed, namely Pennsylvania. It developed that this state does not recognize tandem semi-trailer axles. However, the unit

(*Turn to page* 183)

ONE OF THE MOST STRIKING units in Nabisco's packaging research is this humidity cabinet which duplicates all weather conditions. Here, packaged products are tested for aging, moisture protection, and package durability.

National Biscuit's New Laboratory Steps Up the Power of Research

It investigates problems submitted by all departments, develops new products, works out improved processing methods, and tests latest packages

MORE EFFECTIVE researches in food processing — from basic studies to pilot plant, to finished product—are assured with completion by National Biscuit Co. of its new ultra modern laboratory in New York City.

Organized as a service group, the various departments of this new laboratory were designed to improve quality and cut costs by aiding every branch of the company—production, engineering, purchasing, and sales departments. It even serves the company's various bakeries throughout the country.

There were two major reasons for building this well-equipped laboratory: First, to implement experimentation on a small scale so that cost of any mistakes will not be prohibitive; and second, to promote progress not only in the company but also in the entire baking industry.

Typical of the problems requiring solution is the baking industries' inability to measure flour quality with true precision, despite the fact that present methods do serve a useful purpose.

Back of this research program is management's philosophy: To question those things "that can't be done." The company is not satisfied merely to go along, unquestioningly, with present practices. On the other hand, it does not propose to embrace new ideas until they are thoroughly tested. Hence the program.

Why this philosophy pays off may be put in these words:

A company that encourages and fosters extensive research is a good company to work for. And the long-term research results will bring company stability and job security.

These results of research are: (1) Creation of new products and improvement of current ones, (2) development

of new processing methods and refinement of present-day technics, (3) examination of new packaging materials and adoption of those that prove better than present ones, and (4) investigation of many long-standing problems that affect the company and the entire industry.

To Nabisco, research is not something that one can start and stop at will. It must be continuous. Moreover, the research must follow a well-planned program and have the enthusiasm and support of management. Lack of aggressive research in a company means that progress is blocked and that the employees will not benefit.

A good research organization learns by its previous errors and then decides what its next step will be. And those engaged in these activities must not become discouraged by the mistakes. Instead, they should remember that if they knew what was going to happen, there would be no need for research.

Put it this way: All research efforts were designed to bring new assurances to both retailer and consumer—assurances that they will keep getting from the company the finest bakery products that skill and experience can produce.

How Research Is Organized

Providing an area of 20,000 sq. ft., the laboratory comprises four divisions: (1) Package research, (2) quality control and analytical, (3) experimental baking, and (4) process and products research. All are under the direction of Robert K. Hower. And the laboratory is responsible to Russell M. Shultz, operations vice-president.

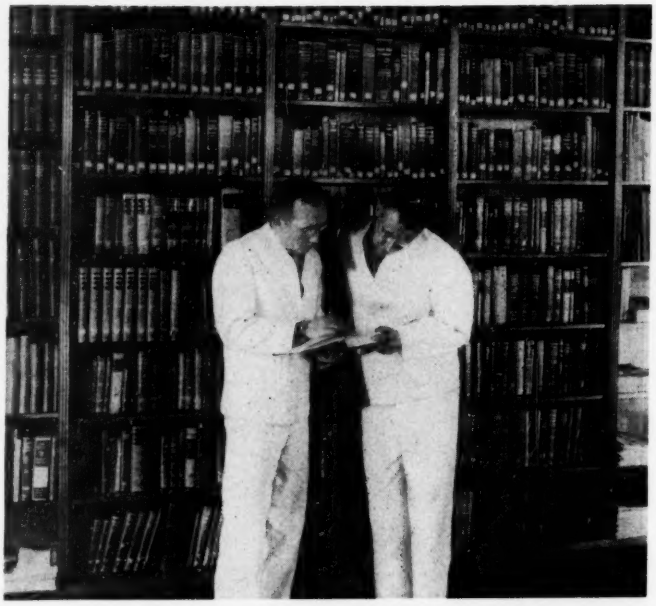
The new research facilities are housed in a architectually attractive laboratory with red tile floors, soundproof ceilings, and removable partitions. Walls and ceilings have been painted white. And air conditioning is used throughout.

Division No. 1—packaging research—is devoted to the development of new packaging materials and methods. Spotlighting the equipment in this department is a humidity cabinet—a smartly designed stainless steel and glass chamber where temperature and humidity can be controlled to duplicate all weather conditions to which packaged goods may be subjected. These conditions are continuously recorded.

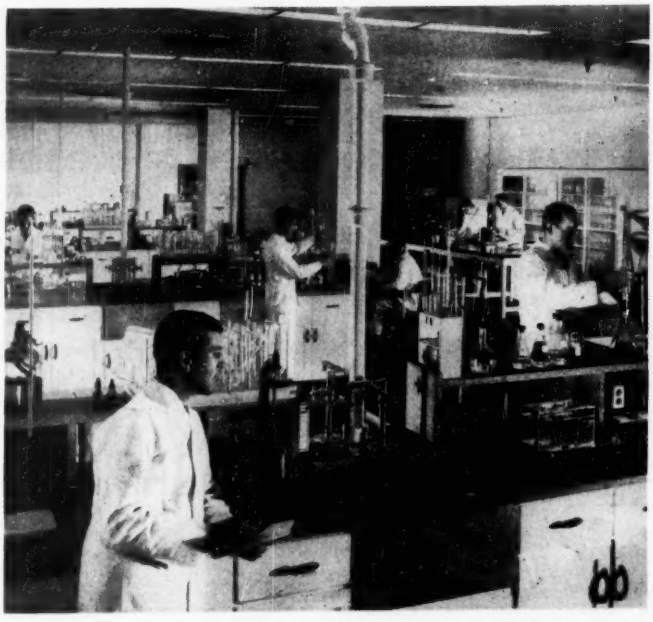
At the present time, this accelerated-weather cabinet consists of two parts—hot-moist and hot-dry sections. In this cabinet, all types of packages are tested, specifically for aging, protection against moisture penetration and losses, and durability of packaging materials. Here, too, new packages are compared with current ones.

This department is also equipped with a full complement of devices for testing liners, wrappers, cartons, and

"From basic studies . . .



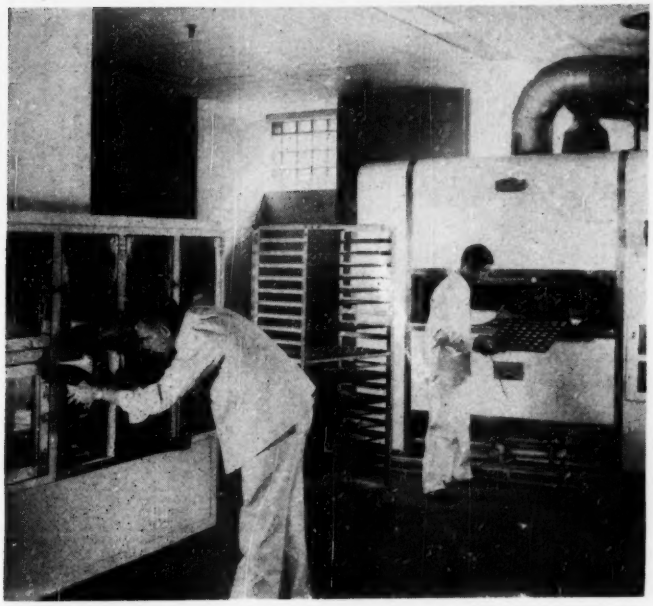
1 **IN THIS** well-stocked technical library, researchers pin down pertinent data. Library plays big role in implementing and expediting research.



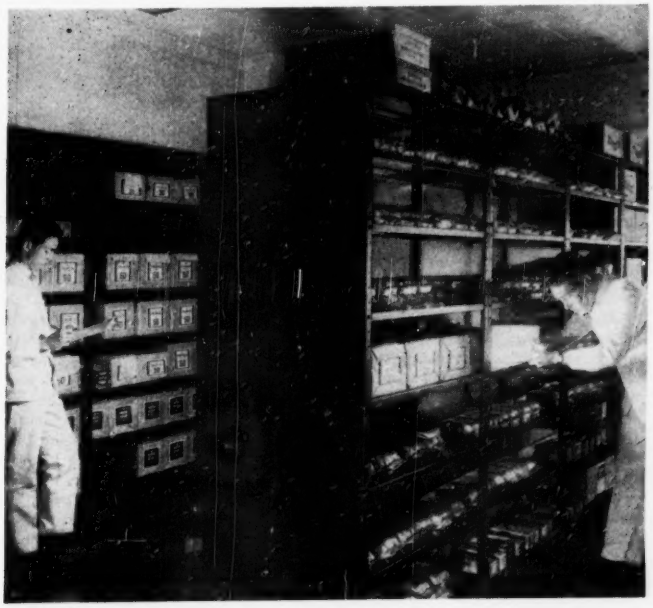
2 **PROCESS AND PRODUCTS DIVISION** develops new baked goods, improves present ones, and investigates different processing technics.

Of Research

. . . to pilot plant and product"



3 **TEST BAKING** is pilot plant's job. Doughs are studied in fermentation cabinet (left). Reel oven (right) is used to bake test batches.



4 **PACKAGED PRODUCTS** are shelf-tested in grocery-store room under conditions duplicating those in retail stores throughout the country.

shipping containers. Among the paper testing equipment are those for evaluating ream weight, bursting strength, tearing resistance, and stiffness.

The second division—quality control and analytical—has the responsibility of evaluating the numerous raw materials used in the manufacture of the company's products. It also assists the production department in maintaining a close control over the quality of finished baked goods.

When, for example, the purchasing department prepares to buy materials, it submits samples from the various suppliers. The quality control and analytical department then tests these samples. And from those that meet the company's specifications, the buyers make their selections.

Typical raw materials analyzed in this department include such items as spices, flour, egg products, shortening, milk, and dried fruits.

Various problems pertaining to quality arise in the production department and are frequently referred to quality control researchers for investigation and solution. The sanitation, insurance, and maintenance divisions also submit problems.

Adjacent to this section is a small darkroom for photographic work.

The third division — experimental baking—is actually a pilot plant equipped to conduct bakery operations on a small scale. Here, there are mixers, fermentation box, cookie sheeter and cutter, reel oven, pilot traveling band oven with automatic controls (see cover picture), high pressure homogenizer and wheat shredder.

In general, this department serves as a proving ground for basic research and development. Mixing, fermentation, baking tests are conducted. New equipment is tried out, also different processing technics. New and improved products developed in other departments are prepared and evaluated.

Adjoining the experimental baking department is the grocery-store room. Here, all research departments and the many company bakeries have their packaged goods shelf-tested under conditions simulating those in retail stores. Products are then examined periodically for crispness, texture, flavor, and aroma. Packages are also appraised. Long-range tests are made on the keeping quality of finished biscuits and the raw materials used to make them.

And now to the final department—process and products research: Activities in this division include development of new products, improvement of those now being manufactured, and investigation of new processing technics. Chocolate coating and icing problems are typical. Studies are also carried out concerning flour evaluation and product scoring.

United Cold Storage Corp. photo

STORED here are 2,500,000 lb. of chocolates. Condition: Excellent. Because temperature and humidity are "right."

How to Store—And Un-Store—Your Candy

Surveys of best practices say: Maintain quality by avoiding condensation on goods, and prolong subsequent shelf-life by holding at low temperature

SOME STRIKING similarities have turned up in two recent independent surveys conducted, respectively, among warehouse companies and confectioners. Purpose of both checks was to focus attention on the proper methods of warehousing candies.

Notable among the findings was the recommendation that care be taken in selecting temperatures in order to steer clear of condensation of moisture (at dewpoint) on candies and confections after they are taken from storage.

One of these surveys, drawing replies from 132 companies, was made by The Refrigeration Research Foundation and the National Association of Refrigerated Warehouses. The other was conducted by the National Confectioners Association. Results of both surveys have been summarized by TRRF Director H. C. "Dutch" Diehl, in the Foundation's *Information Bulletin*. Here are the findings:

Major problem facing warehousemen today is the condensation of moisture upon candies after they have been removed from storage. Condensation is most serious with chocolates, since they turn gray and lose their sheen. And when moisture condenses on hard candies, they become sticky and then form into clumps.

Overcoming chocolate-graying is not easy, for often this problem may be complicated by variations in manufacturing methods or the nature of the ingredients employed. But it is a simple matter to prevent hard candies from sticking together—by holding them in storage rooms with a low relative humidity. And since these candies are temperature-stable, it is not necessary to store them at low temperatures.

Factors in moisture condensation are storage temperatures, geographic location of warehouses, season, handling methods, and storage procedures.

Temperatures in the lower non-freezing range are least frequently used for storing candies. Being too far below the dewpoint, these temperatures are unsatisfactory because the confections will immediately collect moisture after they are taken out of storage into rooms with higher temperatures.

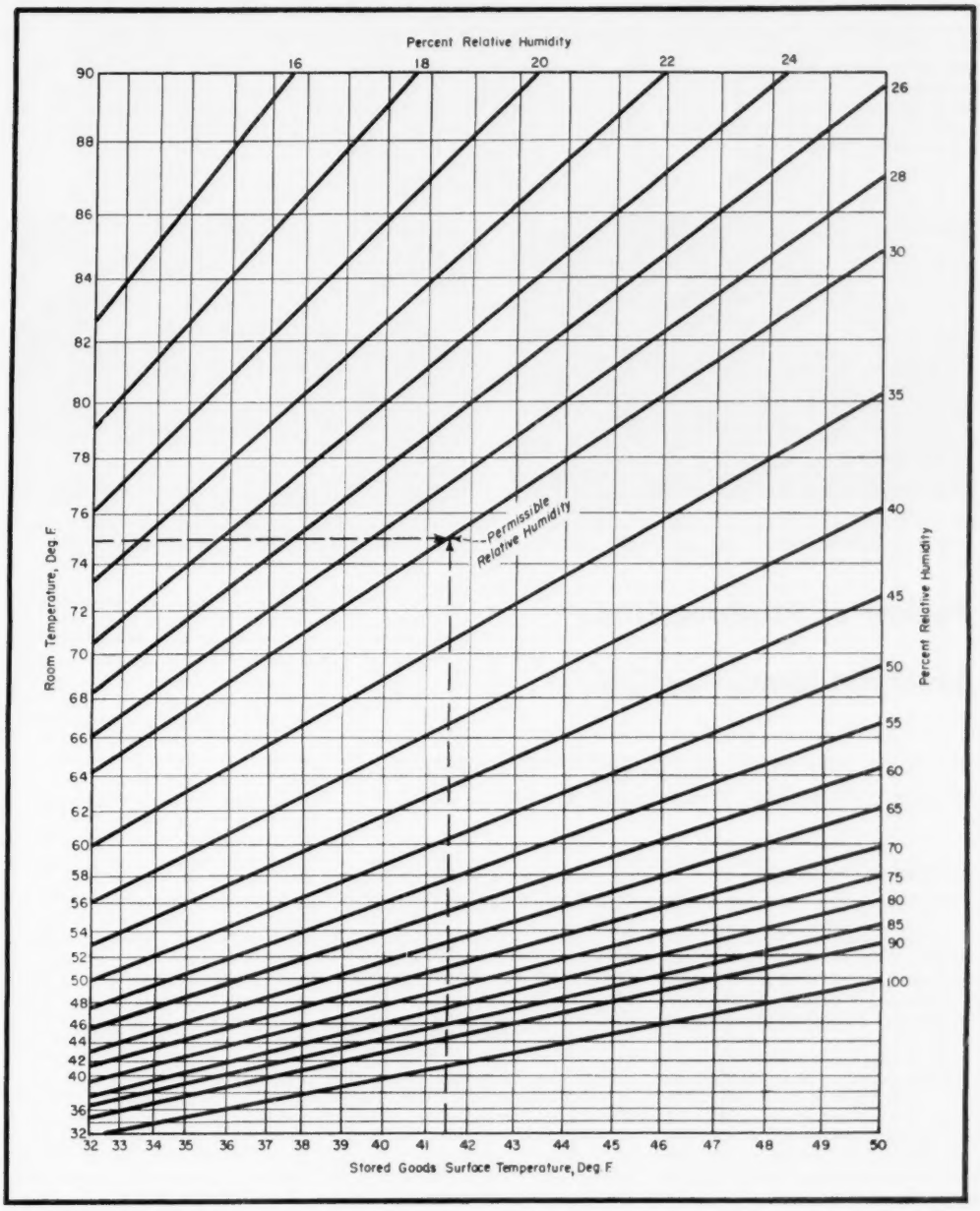
But even if candies are stored at these low temperatures, condensation can be prevented by: (1) Raising the temperature of the storage room gradually before taking out the candies; (2) transferring them into a conditioning room; (3) removing them when outside temperatures are lower, as at night; and (4) schedule removals in other than warm, humid, or rainy weather.

Low Temperatures Not Needed

Temperatures as low as 32 deg. F., or even 0 deg. F., are excellent for holding most candies a year or more. But the chief advantage of refrigera-

Chart Tells If Cooler-Stored Food Can Safely Be Moved to Outside Rooms

Common Trouble Is Moisture Condensation on Goods. You Can Avoid It If You Know Permissible Relative Humidity—Quickly Shown by Scribing Two Simple Temperature Lines on This Graph



TYPICAL PROBLEM and solution are illustrated here by dashlines: Food in question has 41.5-deg. F. surface temperature in cooler, and contemplated is transfer to room where temperature is 75 F. Intersection of two lines shows permissible relative humidity is 30, hence move should not be made so long as room's r.h. is above that figure. Note that the higher the temperature of goods in cooler, the higher the r.h. tolerated in the transfer. (Copyright chart of The Refrigerated Research Foundation, prepared by Prof. Carl F. Kayan, Columbia University.)

tion—preventing insect infestation, retarding rancidity, avoiding softening, and retaining original quality—can be achieved by constantly storing candies at 48 to 50 deg. F.

In long-time holding tests conducted at the Georgia Agricultural Experiment Station, it was found that the storage life of nut candies increased with lower temperatures. This was particularly true with items containing peanuts or pecans. It was also learned that shelf-life of peanut bars was prolonged five to eight times when the storage temperature was lowered from 80 to 34 deg. F.

Storage of chocolate coated candies—cream centers, carmels, and nut creams—at 0 deg. F., or below, has been successful. These chocolates were packed in ice with 30 percent salt and shipped as frozen food. Upon receipt by the consignee, they were put in 0-deg. F. storage. When ready for use, they were tempered in two stages before being taken out of storage—first to 25 deg. F. and then to 45 deg. F. Handled in this manner, the candies showed neither condensation nor deterioration after holding them for about four months in a refrigerated display case.

In a similar instance, chocolates were tempered three to five days at 55 to 60 deg. F. before they were put on sale. Results in this case also were satisfactory. In still another case, excellent results were reported when chocolates were stored at 0 deg. F. However, no specific details are at hand concerning this case, except that

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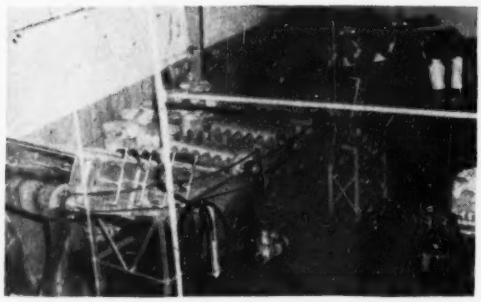
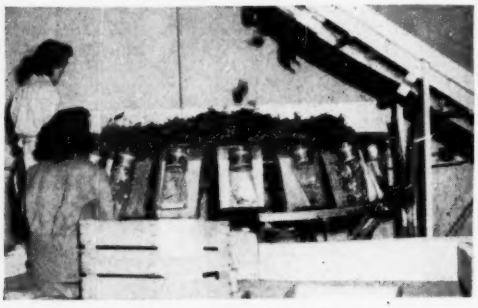


PADDLE equipped rollers move spinach through washer (center). Operators (rear) cull and inspect produce.



STANDING operator pushes spinach into bags. Seated girl removes filled bags from spouts, applies staples.

Packer of Produce Finds Machine Ideas Pay Off

His continuous paddle washer and circular revolving bagger make spinach prepackaging profitable

ROBERT A. LATIMER
Denver, Colo.

Solving production problems with his own ideas on machinery for prepackaging fresh produce has paid handsome dividends to Harry Wise, president of Marketwise-Denver Co., in Colorado.

Operating the first year in a leased building in the "Mile High City," Wise licked most of his machine problems. He then erected his own 40 x 100 ft. building and set up his first prepackaging line. Aluminum was used on all exterior surfaces of the building, including the roof.

The equipment line, consisting of an inspection table, washer, lift conveyor and bagging unit, extends three-fourths the length of the new building.

On the spinach line, the produce first passes over a continuous inspection belt conveyor for dry-grading and culling. To remove the sand, gravel, and other foreign material, an open, $\frac{3}{4}$ in.-mesh belt is employed. Slow movement of the belt permits cullers stationed along the side to take out bad leaves and shake off dust. Foreign matter falls through the belt itself into a refuse receptacle below.

From here, the spinach passes to a high-speed washer. This unit consists of a 12 x 4 x 4 ft. soaker tank, in which are rotating three heavy iron drums, with paddles around their circumferences, spaced similar to the lugs on tractor wheels. In operation, each paddle agitates the water, lifts the spinach through the churning liquid, and deposits it on the next drum, thus passing it in 1-2-3 fashion through the washer.

Then a conveyor, inclined at 45 deg., picks up the wet spinach from the soaker, drying it in the process, and deposits it on the bagging machine.

This bag filling unit consists of a stainless steel disk, 8 ft. in dia., with a 6 in. rail around its circumference. This disk is mounted on a shaft in the center, atop a T-iron framework which sets it at sufficient elevation above the floor. Spaced 10 in. apart around the periphery of the revolving table, are 16 spouts (5-in. dia.). The necks of cellophane bags are tightly stretched over these spouts.

Washed spinach falls from the lift conveyor to the center of this table where it is merely pushed down into the bags by hand. One girl places the bags over the spouts, pushes the turntable along to the next one, and repeats this process, while another girl fills, removes, and staples them shut, for placement in cartons for delivery to retail grocery stores.

While the machine is relatively rudimentary, and depends upon "muscle power" for operation, nothing faster or more satisfactory has yet been developed, according to Mr. Wise.

In addition to solving his own machine problems, he also has set up a shipping-container "remodeling plant." Re-using crate stock, he turns out wooden boxes, of 1-doz. spinach-package size. Cost he reports is 7c. each.

A Special Food Industries Report

VEGETABLE and animal fats, both hydrogenated and unhydrogenated, are used for baking and frying.

SHORTENINGS

For Frying and Baking

Advances by processors of vegetable and animal fats and oils have now achieved a variety of shortenings with the precise characteristics needed for frying or baking specific products — doughnuts, potato chips, nuts, cakes or bread

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New progress in vegetable oil and animal fat technology in recent years has resulted in the production of shortenings with increased primary stability, uniform characteristics, greater utility, and in increased variety.

At the same time, the greater use of semi- and fully-automatic unit process operations in the bakery and allied fields has increased the necessity for optimum as well as consistent performance of ingredients used in the formulation, or employed as adjuncts in the product's preparation.

The importance of fats and oils as quality control factors in these fields is well understood. However, desired performance characteristics of shortenings vary with the specific unit process operation. In cake doughnut manufacture, controlled rate of hydrolysis and post-use physical characteristics are important; in potato chip processing, resistance to oxidative rancidity development is a necessity; in yeast-raised doughnuts and bread, shortening flavor is paramount; and in nut frying, proper handling of shortenings influences quality of final product.

For a better understanding of the problems encountered in the use of shortenings, and the procedures em-

For Best Results, Use the Right Shortening

Product	Recommended Shortenings		
Low sugar cakes	High air incorporating shortenings properly prepared from cottonseed with peanut oil, or from cottonseed oil with an optimum quantity of soya oil.		
High sugar cakes	High air incorporating shortenings properly prepared from cottonseed with peanut oil and superglycerinated, or from cottonseed oil and an optimum quantity of soya oil superglycerinated.		
Cake doughnut frying	Hydrogenated shortenings using cottonseed as a base with minor percentages of other oils	Hydrogenated blend of cottonseed oil and lard	Hydrogenated lard
Yeast raised doughnut frying	Hydrogenated shortenings using cottonseed as a base with minor percentages of other oils	Hydrogenated blend of cottonseed oil and lard	Hydrogenated lard
Potato chips	High stability hydrogenated cottonseed oil	Hydrogenated blend of cottonseed with other non-reverting oils	
Biscuits and crackers	Specifically hydrogenated biscuit and cracker shortenings.		
Bread	Lard	Esterified lard	Hydrogenated vegetable shortening	Hydrogenated vegetable shortening esterified

ployed to enhance their performance, some of the unit process operations in bakery and allied fields will be discussed.

Cake doughnuts are generally mass-produced from prepared mixes which have been standardized to give desired quality characteristics. In this process, dough rings containing correct-temperature water are extruded automatically into frying machines, fried on each side for approximately 45 sec., ejected, and conveyed through coolers. After an adequate cooling period (generally 45 min.) they travel through revolving-drum machines in which they are coated with a sugar compound. The doughnuts are then packed in semi-moisture proof containers.

Machine production rates range up to 600 doz. per hr. Kettle capacities are such that fat turnover is a matter of hours, where continuous production is practiced. The shortening is heated electrically, or by gas, and the correct temperature is maintained by immersion thermostats. Shortening held in a reserve tank atop the unit, flows into the fryer in response to a float which regulates the fat level in the machine. In this manner replenishment is continuous. Where production rates require the use of more than one machine, a melting unit is installed as an adjunct. Short-term-heated melted shortening is pumped from this unit into the reserve tanks of the machines as required.

Special Qualities Needed

It has been established that shortenings intended as frying media for doughnuts should have definite characteristics: They must—

1. Allow proper structural development to occur, as judged by proper volume and open internal structure.
2. Supply bland flavor.
3. Be absorbed in relatively constant quantities.
4. Have physical characteristics which prevent setting of the shortening too rapidly during the cooling period. Further, during the shelf life of the product the absorbed shortening must not oil-off into the sugar coating, causing discoloration and subsequent sugar solution by moisture liberated from the doughnut.

Frying shortenings must also break-in early, as judged by the time required for the fat acid value to reach 0.3 percent. This value should rise to 0.5 percent and remain between 0.5 and 0.75 percent where constant replenishment of shortening is practiced, and where frying is continuous.

A new frying shortening having a fat acid value of 0.3 percent does not at once allow proper structure development to occur. This constitutes the pre-quality period.

When the fat acid value reaches 0.5 percent as a result of hydrolysis, proper development, as judged by optimum specific volume and open internal structure, occurs. This continues when constant replenishment is practiced. Under these conditions, the fat acid value will remain between 0.5 and 0.75 percent. This phase is termed the quality period.

When shortening is not replenished, the fat acid value will rise sharply to 1 percent, and persistent foaming may result. Doughnuts prepared in shortenings at this stage (termed post-quality) will have poor and unpredictable physical characteristics, as well as increased and improper type fat absorption.

Since the dough ring as it is ejected into the shortening is compact and properly spaced throughout the frying cycle, no dough breaks off. This prevents excessive breakdown of the frying shortening, and eliminates the need for filtration or centrifugation.

Non-Reverting Oils Best

Both hydrogenated vegetable and animal fats, and blends of the two, are used in this field. Unhydrogenated, or so-called pure lard hydrolyzes rapidly with excessive polymerization, when used as a frying medium. Fat absorption will be at least 10 percent in excess of that from hydrogenated vegetable shortening or hydrogenated lard. Also, doughnuts fried in lard tend to pocket an excess quantity of absorbed shortening in the crust area. Sugar coating stability and color of the finished product will be adversely affected.

Unhydrogenated vegetable oils, while allowing proper doughnut structural development, also cause instability of sugar coatings.

From a flavor point of view, which is of utmost importance, only shortenings which are free from reversion characteristics, and which resist rapid hydrolyses when handled under proper conditions, should be used. In this light, hydrogenated soya bean shortening does not compare favorably with those prepared from non-reverting oils, such as cotton-seed, corn and peanut, or sunflower alone, or with optimum quantities of soya oil.

Hydrogenated lard, while satisfactory as a frying medium, has a carry-over value which, if not controlled,

is detrimental to doughnut quality. Because of its structural composition, and the short range through which it can be hydrogenated, lard tends to form large crystals on the surface of the doughnuts after they are cooled, causing them to be dull in color. On the other hand, hydrogenated lard's polymerization rate is somewhat less than for hydrogenated vegetable shortening. This is a factor in its favor. And its character may be modified to prevent crystallization where dullness is undesirable.

As a result of the short expected shelf life of doughnuts and the presence of a host of natural antioxidants in the ingredients used in the formulation, rancidity of absorbed frying shortening is not a problem.

Fermented Fried Products

Yeast raised doughnuts and Bismarcks are made by one of two methods. In the first, the dough is prepared, fermented, and cut into rings for doughnuts, or squares for Bismarcks, then dusted with wheat flour or starch to facilitate handling. After proofing, they are fried for an average of 1¼ min. on each side at a mean temperature of 375 deg. F. Bismarcks are sometimes fried submerged. After frying, doughnuts are immersed in a glaze of sugar and water. They are then placed in racks and allowed to cool. Bismarcks are cooled, filled with jelly and coated with cane sugar or dextrose compounds. Weights of the products, including 2¾ to 3½ oz. of absorbed frying shortening, will average 16 oz. per doz.

Flavor of the yeast-leavened fried products is fleetingly elusive, being supplied by basic ingredients contained in the formulation, and principles derived as a result of fermentation. These flavors are enhanced by the readily soluble external high-sugar-content glaze which supplies the primary taste value.

It is apparent that the flavor of absorbed shortening, which represents 11 to 13 percent of the finished product, must not detract from the fine texture-flavors inherent therein. Since the quantity of shortening absorbed also affects finished quality, fat absorption should remain constant. Not only is the quantity absorbed important, but also the manner in which it is absorbed. It should settle interstitially within the product and in the outer crust—not in high concentration in the outer crust alone.

Improper handling of frying conditions, or use of shortenings ill adapted for the purpose, will result in uneven absorption. The product will have poor shape, and overall quality will be reduced.

In order to maintain the frying medium in best condition, continuous frying cycles should be established. The complete absorption cycle should be determined in terms of time, by correlating the absorption ratio of doughnuts per hour with the total quantity of frying fat in the kettle. It is advantageous to fry these products at a rate which will allow a complete turnover of fat at least each 20 frying hours, and, if possible, during a shorter time period.

Where frying must of necessity be done intermittently, the problem of shortening performance is aggravated. If the frying medium is held at temperatures of 365 to 385 deg. F. during the non-frying period, it will darken perceptibly. Off-flavors will be locked into the fat, and the fat acid increase will be linear with hourly time. When continuous frying is not feasible, fat temperatures should be reduced to 200 to 265 deg. F. during the waiting period—the reduction in temperature depending upon the time required to re-raise the medium to frying temperatures. By this method less damage will be done to the fat than will occur if it is held at frying temperature during the resting period.

Means should be provided for replacing the fat absorbed by the doughnuts by introducing melted short-term-heated shortening into the fryer during the process. Thermostats should be checked regularly to insure correct temperature control.

Filtration A "Must"

During frying, dusting-flour present on the outer surface of the products leaches into the shortening. This material, in conjunction with water evolved from the doughnuts, causes rapid hydrolysis of the fat and disturbs the absorption balance. It is desirable to free the fat of such insoluble materials, either by filtering or centrifuging. These operations may be carried out continuously or intermittently, depending upon the quantity of dusting flour used and the production rate. It should be noted that neither filtering nor centrifuging do other than remove insoluble materials from the shortening. They will not remove color fixed-in by heat, or fat acids. But carbon, used in conjunction with a filter aid, will remove off-flavors. Removal of non-fat materials by either method will enhance the frying medium's life.

When filtration is practiced, care must be taken to see that all connections leading to and from the filter unit, as well as the filtering area itself, are cleansed after use. This will prevent rancidity from developing in this adjunct system. In view of this consideration, a filtration system's efficiency and usefulness may be rated by the ease with which it may be cleaned.

If the above procedures are followed, frying fat acid content will tend to remain at a point below 1 percent.

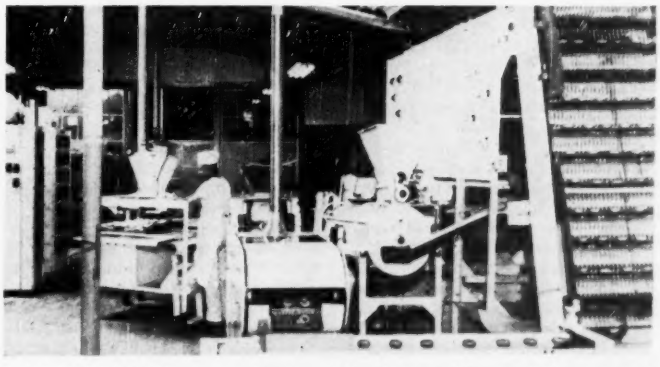
Equipment is now in use which automatically cuts yeast fermented doughnuts and Bismarcks by an extrusion method similar to that used in the cake doughnut field. This unit, in conjunction with the positive temperature and humidity controlled proofer, allows introduction into the frying unit of products free of dusting flour.

Mechanical Operations

Two types of processes are represented in this new development.

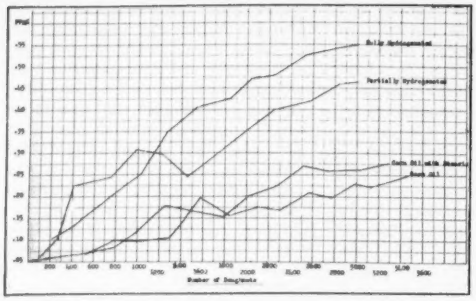
1. A semi-automatic process, consisting of an automatic cutting unit which deposits the dough on trays that are fed manually into the posi-

Hydrogenated Fats Are Best For Doughnuts

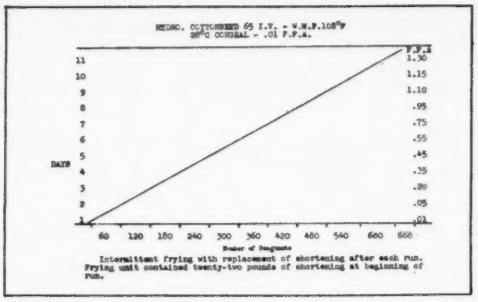


CAKE DOUGHNUTS are usually mass-produced at speeds up to 600 doz. per hr. They require shortenings that are free from reversion, resist rapid hydrolysis, and do not oil-off into the sugar coating. Shown is 100 doz. streamlined unit.

Curves Show How Replenishment Affects Frying Fats



CONSTANT REPLENISHMENT of doughnut frying shortening, together with continuous frying, maintain fatty acid content at optimum point to assure ideal doughnuts.



INTERMITTENT FRYING with replacement of shortening after each run results in a steady increase of fatty acid, and doughnuts with poor physical characteristics.

tive proofer. After proper proofing time, the trays are removed and lowered into a frying unit designed for the purpose. Doughnuts are automatically turned after they have been fried for the proper length of time on the first side. Semi-automatic equipment is used to apply the glaze.

The frying unit used in this operation is heated electrically or by gas. Kettle capacity has been correctly established in terms of heat transfer and absorption ratio. The fat turnover at the unit's rated capacity—100 doz. per hr.—is well under 14 hr. A unit is provided from which melted shortening may be fed into the fryer to maintain the desired fat level. Since no dusting flour is used in this operation, there is no need for, or advantage to be obtained from, filtration processes.

2. A fully-automatic unit that has hoppers from which the fermented dough rings or Bismarcks are extruded from cutters onto trays which carry them through a proofing cycle. Still on the trays, they are ejected, properly spaced, into a fryer, where they are carried forward, turned at the correct time and fried on the other side. This unit is so constructed that Bismarcks may be fried submerged. Fried doughnuts are conveyed through a glazing unit, then through a cooler. This unit has a capacity of 600 doz. per hr.

The frying kettle is balanced in terms of production and fat capacity. In both the semi- and automatic operations, frying medium fat acid value, during rated production, will remain between 0.5 and 0.75 percent.

Generally speaking, shortenings that are satisfactory in cake doughnut preparation have applicability as frying media in this field. Since flavor value is so important, shortenings which revert in flavor, or become unflavorful during heating, should not be used. This latter group includes unhydrogenated animal or vegetable oils. There is successful performance by hydrogenated vegetable shortenings having good stability against hydrolytic cleavage, also by hydrogenated lards.

Making Potato Chips

For potato chips, properly chosen potatoes are held under conditions calculated to reduce total sugar content and thus prevent excessive darkening of the finished product.

After mechanical removal of the skin and eyes, chips—averaging .05 in. in thickness—are cut and then washed to remove suspended starch and soluble sugars. They are then ready for processing.

Both batch and continuous frying processes are in use. In batch operations, chips are submerged in deep kettles of fat held at temperatures of 360 to 435 deg. F. In continuous processes, finger-like claws move the chips forward through shallow trays containing the frying medium.

After frying, the chips are allowed to drain, are salted, cooled and packaged. They usually have an average moisture content of 3.5 percent and a fat absorption value of approximately 40 percent.

Since the fat absorption level is high, responsibility for primary taste value is placed upon the absorbed shortening. Therefore, the fat must be bland or flavorful in character, and it must remain so during the shelf life of the chips, which may run for an extended period.

A large quantity of water is liberated during the frying process. And this, in conjunction with suspended overheated broken chips, causes rapid hydrolysis. Vaporization of the excessive water produces steam which tends to deodorize the fat. This is a distinct advantage.

To enhance the stability of frying fats for potato chips, there is recommended filtration to remove suspended potato particles and starch degradation products. It will be found advisable to use an absorbent material in conjunction with a filtering aid. Where operation scope does not allow for the purchase of a filter unit, removal of suspended materials by bag filtration will be found helpful.

Constant replenishment of absorbed fat by pre-melted short-term-heated shortening will improve the quality of the absorbed fat in terms of flavor and stability. Fat quantities should be limited, where possible.

Rancidity of Chips a Problem

Due to the large surface area of the chips, shortening is exposed to air in film effect and tends to become rancid. To offset this, antioxidants, dusted onto the chip with the salt, have proven of extreme value. Recent investigations suggest that a carry-over effect may be obtained by adding an antioxidant such as butylated hydroxyanisol to the frying medium. At this writing, however, this has not been confirmed. So it still appears that the most satisfactory application time is post-frying.

Potato-chip stability is related to condition of the material at the time of frying, also to frying conditions, as well as to packaging containers used. A balanced operation, in which antioxidants are used in conjunction with proper packaging methods and suitable containers, will assist in maintaining chip quality.

Notwithstanding the fact that waxy off-flavor and oxidative rancidity are the two major fat problems facing the fryers of chips, there is little uniformity of opinion concerning the best type shortening to use. In certain sections of the country, prime summer yellow cottonseed oil and refined corn oil are used. Coconut and hydrogenated vegetable shortenings are employed in

other sections. The choice of frying medium is governed by the chip character sought in the particular area. From a performance and stability point of view, however, high stability hydrogenated non-reverting shortenings provide best results.

Roasting of Nuts

Nut roasting is an industry in which shortening stability has a marked effect upon product quality. Since the nuts are packaged and held for long periods of time, shortening used must have marked resistance to rancidity. If the nut fractions, which are deposited into the fat, remain for extended periods, they will adversely affect its flavor. For this reason, continuous and intermittent filtration is widely used in this field, and it has markedly assisted shortening performance. High stability shortenings, resistant to hydrolysis and rancidity, are indicated.

Leavened Cakes

In chemically leavened baked goods, shortening performs primarily as a necessary adjunct in the development of physical characteristics. Through its weakening action on flour gluten (by causing constant dissociation of the strands during baking) it tenderizes the cake, thereby enhancing eating quality.

Chemically leavened cakes are usually classed as high- or low-ratio. The terms refer to the percentage of sugar in ratio to the flour. Low-ratio cakes contain less than 1-part sugar to 1-part flour. High-ratio cakes contain 1-part or more of sugar to 1-part of flour. In the latter formula, greater total free water is available due to the decrease in flour content. A ratio of high water, high sugar, low flour then exists. In both types, efficiency of shortening performance is of utmost importance in relation to quality control.

In preparing both products, shortening is sometimes creamed with sugar before the remaining ingredients are added. Shortening may also be creamed with the flour and sugar, or it may be mixed with all the ingredients as in the so-called single-stage method.

Adequate Shortening Performance

To be effective, the shortening must have the ability to entrap relatively large amounts of air in the form of tiny cells. This will produce a batter-emulsion in which the entities—protein, fat, carbohydrate, air and water, as well as CO_2—exist in phase form in definite relationship to one another.

In the preparation of cake batters, shortening-air-incorporation-efficiency is judged by a lightening in color of the creamed mass, and an increase in apparent batter fluffiness, as well as an increase in batter-specific-volume. If the batter-specific-volume increase is correct, the plastic shortening (containing finely distributed trapped air, in conjunction with water vapor resulting from steam under pressure, and liberated CO_2) will produce a cake of firm, even textured internal structure. It will have good crust color, proper volume, and a feathery, uniform grain. Tenderness of product will be insured.

When shortening performance is inadequate, batter-specific-volume will be low, and cakes having low volumes, tunnel insides, and poor crust color will result. There will be a decrease in product tenderness.

From observations of cakes made with many types of shortenings, hydrogenated from specific oils and processed in various manners, it seems apparent that the physical properties of the shortening, as well as the character of the oils from which they are made, are important factors in their action.

Recommended Fats

Shortenings intended for use in cake formulation should be hydrogenated from oils which produce materials having wide workable plastic ranges. If the shortening is too hard or too soft, air incorporation capacity is impaired. Liquid oils will incorporate no air, neither will unhydrogenated lard. The shortening must be properly plasticized and tempered to guarantee maintenance of physical consistency during allowable storage temperature changes. It must be bland in flavor and remain bland during shelf life of the product in which it is included.

Properly processed cottonseed shortenings, or shortenings formulated from a blend of cottonseed and peanut oil, have characteristics providing unusually good performance in cake preparation. While there is no doubt that great advances have been made in the processing of soya bean oil, the fact remains that air incorporation values of shortenings prepared from this oil alone, or shortenings in which this oil is a major component are extremely low. This is graphically demonstrated in the two cakes pictured on this page. The one on the left was prepared with an all-hydrogenated soya bean shortening, the other with an all-hydrogenated cottonseed shortening. It is easy to observe the difference in volume and crust character.

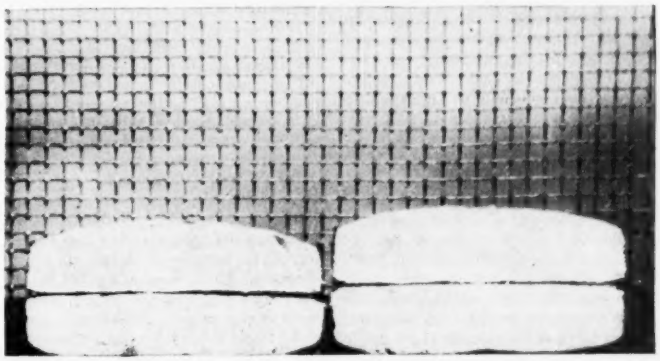
In the high-sugar, high-free-water-ratio cakes, superglycerinated shortenings are employed. They are comparable, in basic oil composition, to those used for low ratio cakes, and they contain from 3 to 7 percent of a mono-ester. Physical characteristics must be similar to the non-emulsifier shortenings standards.

It has been observed that the inclusion of mono-esters does not enhance the performance (from an aeration point of view) of shortenings that do not incorporate air alone. Effect of the mono-ester is on water absorption, and in this respect its efficiency is marked. Since physical properties of both type shortenings are so important, it will be well for the user to store these products at temperatures suggested by manufacturers.

Bread Best With Lard

Lard, due to its high shortening value and flavor producing result, is prized as the best shortening for use in bread. However, hydrogenated vegetable shortenings are also used. Esterified lard and esterified vegetable short-

Cake Volume Indicates Shortening's Worth



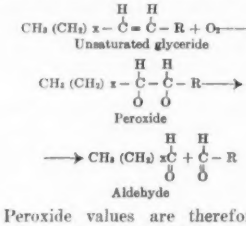
EFFECT OF DIFFERENT SHORTENINGS upon cake volume. Small volume of cake (left) indicates low air incorporating value of shortening made from soya oil. Cake (right) was made with cottonseed shortening.

enings have been found to enhance overall quality by increasing product freshness and flavor. Hydrogenated lard is also used. Lard has been standardized in terms of greater stability and better primary flavor by use of advanced processing methods, as well as by the judicious use of antioxidants with primary and carry-over value.

Use of Antioxidants

Development of undersirable flavors in foods containing fats and oils, resulting from oxidative changes in the shortening, have been of major concern to processors. And much material loss has occurred due to rancidity development.

It is generally assumed that atmospheric oxidation of fats and oils proceeds in the following manner:



Peroxide values are therefore an index to the relative freedom from rancidity of a shortening, and a value correlatable with organoleptic evaluation of fat flavor may be obtained from the measurement.

Variation in original stability of fats and oils is attributed to the presence or absence of minute quantities of powerful phenolic anti-oxidants of which the tocopherols are the most prominent. Vegetable oils are known to be rich in these substances, and lard contains no such substance. Stability of sesame oil, specifically, is due to the presence of the powerful phenolic antioxidant—sesemol.

Hydrogenation enhances the stability of all fats and oils by reducing the most oxygen-sensitive bond linkage in the oil. Through hydrogenation, lard which has an original stability of 2 hr. (as measured by the Swift active oxygen method) will be increased to above 25 hr. Vegetable oils, hydrogenated to an iodine value of 62-67 from 110-120 will increase from 12 to 100 Swift hours.

These fats may be further stabilized by the inclusion of antioxidant compounds after processing, or by the use of products which, during processing cleave into antioxidants.

In general, these antioxidants are either phenolic or acidic, and their action when used together is generally more pronounced than when compounds within either group are used alone. This mechanism is known as synergism and the cephalin fraction of lecithin has specific application in this consideration.

In order to be used in fats and oils primarily, and subsequently in basic foods, an antioxidant must meet certain definite specifications: (1) It must be non-toxic, (2) It must be bland in flavor, (3) Its action should be marked in small concentration, and (4) It should be soluble in the fat, or at least easily dispersable.

From a utilization standpoint the antioxidant activity must be carried over into the processed food and maintain stability of the fat during the product's shelf life.

Many compounds have been found to exhibit marked effect upon primary stability of animal fats and vegetable oil, both before and after hydrogenation. Most of these products are not used, however—due either to their known toxidity or flavor value.

The most generally used antioxidants are, therefore, few in number. In this group are some of the most effective of the following compounds.

1. Gum guaiac
2. Nordihydroguiariatic acid
3. Butylated hydroxyanisol
4. Citric acid
5. Phosphoric acid
6. L-ascorbyl palmitate
7. L-iso-ascorbyl palmitate
8. Propyl gallate

In their use it should be realized that the presence of prooxidants, such as copper or iron, negate antioxidant value of most compounds, and that some antioxidants are not active at alkaline pH's. Thus, NDGA, which will increase lard stability ten times, has little carry-over action in soda crackers. Carry-over effect of butylated hydroxyanisol in frying operations is not as yet established.

In many bakery products the problem of rancidity does not exist, due to the antioxidants naturally present. Doughnuts and many sweet-goods products are examples of this class.

Soya Oil Zooms

HOW PRODUCTION of Soya Bean Oil Has Overtaken Cottonseed* (Figures Are in Million Pounds)

Year	Cottonseed	Soya
1931	1,694	40
1932	1,446	29
1933	1,303	26
1934	1,109	78
1935	1,164	209
1936	1,364	184
1937	1,961	279
1938	1,409	416
1939	1,325	533
1940	1,425	564
1941	1,250	707
1942	1,402	1,206
1943	1,179	1,219
1944	1,303	1,347
1945	1,002	1,415
1946	1,012	1,531
1947	1,356	1,533
1948	1,690	1,730

*USDA Agricultural Statistics

This fact is no doubt the result of the optimum content of sugar, which agent has been proved many times to have high antioxidant activity. Full or medium fat content soya flours act as antioxidants probably because of the antioxidant compounds inherent in the oil phase of these products. Oat flour also has anti-oxidant properties.

Emulsifying Agents

In 1933, a new type cake shortening containing a small percentage of mono- and di-glycerides was introduced. The surface activity caused by the hydrophylic and lipohylic groups within these glycerides led to the development, by its powerful emulsifying action, of a new class of cakes distinguished by high sugar and water contents in relation to total flour solids. Tenderness as well as extended shelf life was also provided.

Since that time, the ester used in the shortening has been applied to many other uses, and literally hundreds of other esters have been prepared and evaluated.

From a utilization consideration, today's status of knowledge of emulsifying agents may be compared with that concerning shortenings 20 years ago. This is due mainly to the host of possible emulsifying agents and the difficulty of proper evaluation.

There are now available mono- and di-glycerol esters of each of the fat acids of individual oils as well as the mono- and di-esters of the whole fat acid series of the individual oil. The latter series may be prepared from the oil before or after hydrogenation. The mono-ester value of each compound within this series may be varied by distillation. Sorbitol and manitol esters of individual fat acids are also prepared, as are the controversial polymerized ethylene esters of fat acids. It is possible to formulate many hundreds of other materials which will have varying emulsifier action, due either to molecular weight consideration or mono-ester value.

The following consideration must govern the use of mono- and di-glycerides: (1) They are not intended as a substitute for fats, nor do they allow replacement of fat in foods; and (2) Their effect, simply speaking, is to cause ease of dispersion of the shortening within the dough system and to balance moisture after baking.

As a result of progress made in oil and fat technology, a wide variety of shortenings intended for specific applications, insofar as use is concerned, are available. It is evident that the utilizer has definite responsibilty for insuring proper uniform performance in the particular application by exerting effort to use the shortening best suited for the particular purpose.

Juice, Atmosphere, Bacteria Curves Cleared Way to Verdict

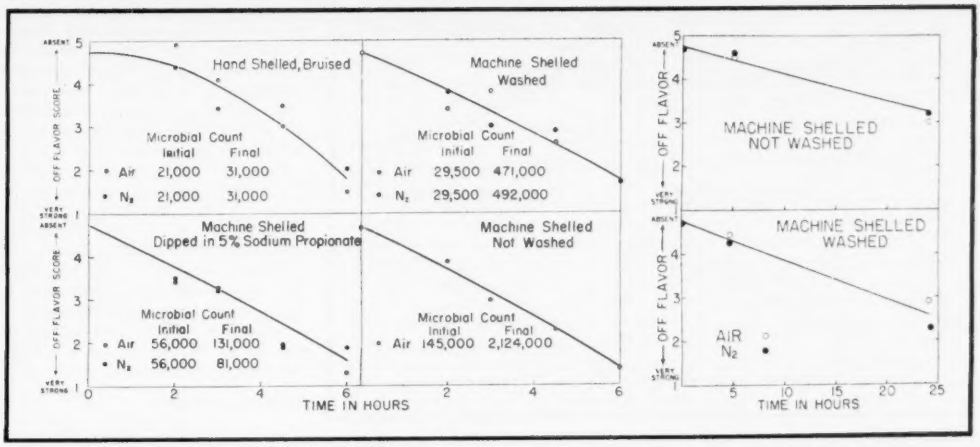


FIG. 1. THAT OFF-FLAVOR DEVELOPMENT is not caused by adhering vine juice, surrounding atmosphere or increase in microbial count is seen in graphs of shelled peas held at 75-80 deg. F. (left) and 40-45 deg. F. (right), precluding accumulation of products of respiration.

Time Lapse Gets Top Blame For Shelled Pea Off-Flavor

WRRL shows enzymatic action proceeds without regard to bacteria and environment. Good mechanical pod separator seen as answer, with seven advantages noted

W. F. TALBURT and R. R. LEGAULT

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Recent tests conducted at the Western Regional Research Laboratory, Albany, Calif., strongly indicate that "delay" off-flavor developing in peas after they have been shelled is associated with their life functions and is not due to adhering vine juice, products of respiration in surrounding atmosphere, bacteria, or other external environmental factors.

No treatment was found that would substantially retard off-flavor development due to time lapse between shelling and blanching, other than chilling the peas to near ice temperature.

In a subsequent study (not detailed here) bruising was found to be a major contributor to off-flavor[1]. Even the slight bruising that is incident to hand shelling was found sufficient to cause rapid flavor deterioration. However, elimination of bruising from commercial processing procedures would be very difficult.

The experiments cited here comprised a systematic examination of the rate of deterioration of shelled peas under a variety of conditions. Object was to determine causes and if possible, suggest control procedures. Accordingly, raw peas were held (1) at high and low temperatures, (2) with and without control of microorganisms, (3) washed and unwashed, and (4) in aerobic and anaerobic atmospheres. An organoleptic panel tasted the peas at different time intervals and reported the various off-flavor scores.

Two series of tests were conducted—the first *precluding* the accumulation of products of respiration, the second *allowing* it. Presented in a box (see bottom of next page) is information on the peas used and a description of the tests.

First-Group Findings

With the first test group, all samples of peas delayed as 80 deg. F. for 6 hr. developed such strong and objectionable off-flavors that tasting was discontinued. This off-flavor was detected by the taste panel in all samples delayed more than 2 hr. It was moderate after 3 hr. and strong after 4½ hr.

The bacterial populations of the various samples of shelled peas were not an index of the amount of off-flavor present (as shown in Fig. 1). The bruised hard-shelled and sodium-propionate-treated samples, with low initial and final plate counts, developed off-flavors at much the same rate as the machine-shelled unwashed samples that had much higher initial and final plate counts. Irrespective of bacterial populations, all samples that were delayed at room temperature developed off-flavors at very nearly identical rates.

Comparing bruised hand-shelled peas or machine-shelled washed peas with the machine-shelled unwashed samples, it became apparent that pod juice had little, if any, effect on off-flavor developed at room temperature. Other experiments (not reported here) showed the same objectionable off-flavor developed in washed or unwashed peas before microbial souring occurred. It is possible that this off-flavor, found in all samples held at room temperature, is the "sharp" off-flavor, once ascribed to the presence of vine juice.[2]

Shelled peas, washed and unwashed, held at 40-45 deg. F. for 24 hr. under aerobic and anaerobic conditions, were scored low in characteristic pea flavor and had developed some objectionable off-flavor. The four samples (Fig. 1) developed off-flavor at similar rates.

Loss of sugar and ascorbic acid was more rapid at room temperature than

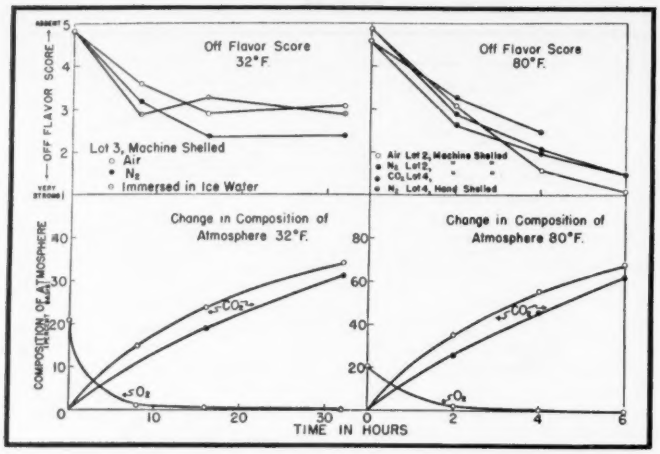

FIG. 2. ALLOWING contact with products of respiration, shelled pea off-flavor remains relatively high when peas are stored at 32 deg. F. (top left), as compared to steady drop at 80 deg. F. (top right). Bottom graphs show atmosphere changes with cooled and ambient temperatures.

at lower temperatures. But within the periods of time included in the experiment, losses were in no instance greater than 10 percent.

Second-Group Results

Since the dynamic conditions set up in the first test group were quite different from actual field conditions, a second group of shelled peas was tested, allowing accumulation of products of respiration. This simulated more closely the conditions found in commercial operations.

Essentially anaerobic conditions quickly developed in the samples held in an initial atmosphere of air. This required approximately 2 and 10 hr., respectively, for the samples at 80 and 32 deg. F. (Fig. 2). Substantial evolution of carbon dioxide occurred in all samples. Respiration, as evidenced by such evolution of CO_2, was sharply retarded at 32 deg. F., but was still proceeding at a fairly high rate.

Shelled peas, stored at room temperature, developed objectionable flavors at much the same rate, whether the initial atmosphere was air, nitrogen or carbon dioxide (Fig. 2). Tasting of some of the samples was discontinued after 4 hr. because of highly objectionable off-flavors. At the room temperature condition, hand-shelled peas, packed in nitrogen, deteriorated in flavor at about the same rate as the machine-shelled samples.*

Peas held at 32 deg. F. in an initial atmosphere of air or nitrogen, or immersed in ice-water, developed moderate off-flavor after 8 hr. Thereafter, however, there was little change with additional delay up to 32 hr. There was little evidence that immersion in ice-water resulted in greater loss of organoleptic quality than holding in the air at 32 deg F. for a comparable time.

Discussion of Results

Since peas after vining are so susceptible to off-flavor development, it is evident that every effort must be made to rush them from vining station to the plant. When peas are maintained at room temperature, 1 hr. delay is the maximum before quality is impaired. Some processors have practically eliminated delay between vining and blanching by vining peas at the plant. This procedure usually necessitates longer hauls in getting the pea vines to the vining station, thereby increasing the

*During 1947 season, other lots of raw hand-shelled peas (Laxton's Progress) were used in similar experiments to obtain additional data. These tests were simplified, in that shelled peas were held in open containers at room temperature (70-75 deg. F.) for 4 hr. and samples were subjectively assayed for off-flavor. Strong off-flavors were present in all samples.

RESEARCHERS' WORK BRIEFED: Types of Peas and Test Details

High-quality market peas grown in San Mateo County, Calif., were used. Pods were hand picked after reaching optimum maturity, heavily iced in field crates immediately after harvesting (except one control lot) and transported to the laboratory within 3 hr. Tenderometer readings were not available. However, solids contents ranged from 19 to 20 percent.

Peas picked in the afternoon were held in 32 deg. F. storage overnight and used the following day, while those picked in the morning were used the same day. Unless otherwise stated, peas were mechanically shelled in a pea huller and mechanically size graded. Sieve sizes 3-6 were used.

Analyze for Sugar, "C", and Gas

Sugar analyses were made, using a modification of the Hassid* method. Ascorbic acid was assayed by a modification of the Loeffler and Ponting* method. Gas analyses were made, using an Orsat type apparatus.

The following lots of June-picked pod peas were employed: (1) 500 lb. Laxton's Progress picked during the afternoon and heavily iced in the field; (2) 100 lb. Giant Stride picked during morning, iced same way; (3) 100 lb. Giant Stride picked during afternoon, iced same way; and (4) 125 lb. Giant Stride picked during morning, one-half not iced. All were transported to laboratory at ambient temperature.

For organoleptic assay, peas were cooked by adding 300g. lots of them to 150g. of boiling water and boiling in a covered container 9 min. Preliminary experiments had shown that steam blanching and freezing of raw peas with objectionable off-flavors did not appreciably affect the amount of off-flavor. The cooked samples were scored for objectionable off-flavor by a ten-membered panel of experienced judges, using a scale of 1 to 5 with descriptive adjectives as follows: 5, absent; 4, slight; 3, moderate; 2, strong; and 1, very strong.

A. Delay of shelled peas under conditions precluding accumulation of products of respiration:

Controlled aerobic and anaerobic conditions at different temperatures were maintained in containers, arranged so that a stream of air or nitrogen could be forced through the peas to obtain these respective conditions. Nitrogen was bubbled through a solution of potassium nitrate to adjust the relative humidity to about 85 percent and thence to flowmeters so that a uniform flow rate of 1 liter per min. through each unit could be maintained. Compressed air was filtered through pelleted montmorillonite and glass wool before humidification in order to remove odors and foreign material. Gases, after humidification and metering, were forced slowly upward through the peas, to escape, along with the products of respiration through small perforations in the lids.

Treatments and Conditions

Sufficient peas (Lot 1) were shelled and size graded to give ten 2,500g. samples of machine-shelled peas and two 2,500g. samples of hand-shelled peas. No special precautions were used to avoid bruising during hand shelling or size grading.

The treatments and conditions included: (a) machine-shelled peas, washing in tap water to remove pod juice; (b) same, no washing;

interval between mowing and vining. Effect of delay at this stage has not been fully investigated.

In many cases, vined peas must be hauled long distances. These peas are iced or hydrocooled at ice temperatures to minimize undesirable changes. This enables them to be held 6 to 8 hr. without serious loss of quality.

But neither of the above methods of handling peas prior to processing is the final answer to the off-flavor problem. Among other things the first method, vining at the plant, is likely to limit the supply of peas available to a given plant. The second method, refrigeration, is expensive and only a palliative.

Seen Solved by Picking Machine

It seems that the ideal, and perhaps ultimate, solution of the problem would be a satisfactory mechanical picker for separating the pods from the vines. Certain obvious advantages are inherent in this method of harvesting: (1) Pod peas could be harvested at optimum maturity and held in cold storage for several days without serious loss of quality, thereby providing a means of evening out the flow of raw materials into the lines[8]; (2) delays between shelling and blanching could be reduced to minutes; (3) it would eliminate the problem of removing foreign materials, such as nightshade berries, from the peas; (4) simpler and more effective methods of quality grading could be used; (5) greater recovery of peas should be possible; (6) fewer bruised, broken and split peas should occur in the course of handling; and (7) transportation of pea vines would be virtually eliminated.

Findings Through the Years

Canners and freezers have long recognized that peas will deteriorate rapidly in quality after removal from the pods, and that loss of flavor and development of off-flavor are accompanied by losses of ascorbic acid and sugar.

This deteriorative process has been attributed to activity of enzymes contained in vine juice, to altered respiration induced by development of anaerobic conditions within the peas, to enzymatic processes accelerated by bruising peas in the viner, and to microbiological activity. It has been demonstrated that peas in the pod deteriorate at a much slower rate than do shelled peas, and that pod peas are relatively stable for days at ice temperatures.

Following is a brief on findings through the years.

One of the earliest investigations on the effect of delaying shelled peas reported[1] "poor flavor after 4 hours, off-flavor after 6 hours, and terrible flavor after 8 hours" (evaluated after canning). A later investigator[2] deplored the high percentage of peas that had soured in hoppers and field boxes.

Going on to describe a weedy and peculiar flavor in certain lots of peas that was reminiscent of ragweed, marshweed or nightshade, he traced it to vine juice that adhered to the peas. He said this juice set to a "semi-rubber coating that is almost impossible to wash off after it dries."

It was subsequently reported[3] that vined peas could be held at 32 deg. F. for several days without seriously affecting their quality. Other researchers stated[4] that changes in the characteristics of delayed shelled peas appear only after canning.

Prior to 1937, little work had been done on shelled peas intended for freezing. But in that year, it was shown[5] that the quality of vined Alderman peas was adversely affected when held at 70 deg. under laboratory conditions. In 1942, this work was confirmed[6].

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(c) same, washing in 5 percent sodium propionate solution to remove pod juice and retard microbiological growth; and (d) hand-shelled unwashed peas, bruising by pressing between two flat surfaces till dark areas showed on most of the peas.

The bruised hand-shelled peas were included to simulate commercially vined peas without adhering vine juice. Samples from each of these four treatments were maintained at room temperature (75-80 deg. F.) under aerobic and anaerobic conditions. And in addition, peas treated, as in (a) and (b) were held under aerobic and anaerobic conditions at near ice temperatures.

All samples were handled rapidly so that not more than 30 min. elapsed between shelling and placing the peas on test. Sub-samples were removed from each container periodically for chemical analyses, plate counts, and organoleptic assay.

B. Delay of shelled peas under conditions allowing accumulation of products of respiration:

In field operations, vined peas are usually transported in field lugs to the processing plant and dumped directly from these boxes into the processing lines. Peas, under these conditions, are in contact with the various products of respiration which accumulate during the delay prior to processing. Since the dynamic conditions set up in the first set of experiments are quite different from those found in lug boxes of stored peas, another set of experiments (Lots 2-4) was devised simulating more closely the conditions found in commercial operations and allowing the accumulation of the products of respiration.

Special Container Employed

To permit this accumulation, another type of container was employed for storing the shelled peas. A short piece of copper tubing was tightly soldered to a small lateral opening near the top of a No. 2¼ sanitary-type tinned can. After shelling, sizing, and adjusting to the proper temperature, 275g. of peas (sufficient to fill container) were put into each of the cans and the tops sealed with a double seamer. Samples to be gas packed were placed in vacuum desiccators, evacuated twice, and the vacuum released each time with the desired gas. This procedure reduced the oxygen content to about 1 percent. Sufficient units were packed so that one entire assembly could be removed from storage at a designated time and its contents used for the assay.

Pressure Controlled, Diffusion Prevented

After gas packing, inverted U-shaped glass tubes were attached to the copper tubing by means of rubber connections and the open ends of the U-tubes were immersed in 5 percent sulphuric acid solution. This made it possible to maintain the pressure inside the cans at one atmosphere and, at the same time, prevented diffusion of air into the containers. Samples to be held at room temperature were immersed in a water bath maintained at 80 deg. F. Bubbles of gas started escaping from the open ends of the U-tubes shortly after immersion of the samples and continued throughout the experiment. Other samples for holding at near freezing temperatures were placed in a room maintained at 32 deg. F. Gas was evolved very slowly from these samples.

SPANNING THE STREET did it. Shipping facilities were thus directly connected to the plant in straight-line fashion—the shortest distance between two points—and the old costly and tedious shuttle-truck job was eliminated.

They "Bridged" Their Way to Savings

Maybe you, too, are "snafued by roundaboutness" in some key operation? If so, this meat packer's radical answer may be just the hint you need for contriving speedier handling with fewer man-hours

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

By "taking to the air," Goetze's, Inc., Baltimore meat packer, has now solved a baffling loading and unloading problem which had been costing the company considerable money in time and labor.

To put it briefly, the railroad facilities necessary to the company's traffic were on the *other* side of the street. Also, the "hemmed-in" hill-and-embankment topography of the area complicated matters. And in this situation, there seemed nothing to do but to continue driving shuttle trucks between the plant and the public railroad team-track two blocks distant.

Of course, double trouble was the result—that is, double loading (plant-to-truck and then truck-to-freight and also double unloading (freight-to-truck and then truck-to-plant).

But finally, after persistent weighing of the problem, there came the solution: If the loading and unloading couldn't be done efficiently on the ground, then it could be done through the air—by constructing an enclosed bridge spanning the street.

Forthwith, the company constructed a capacious dock alongside the railroad tracks on the 30-ft.-high embankment across the street. In the 80-ft. space between dock and street it then built its new cold-storage warehouse. And running directly from the back of the dock, through one side of the new warehouse, over the street, and into the plant proper went the new enclosed bridge.

This highly-efficient receiving and shipping set-up quickly brought seven benefits: (1) It provided smooth, continuous movement of meats both in and out, (2) cut down the product-travel distance nearly two-thirds, (3) reduced the number of handlings by one-half, (4) shortened loading and unloading time about two-thirds, (5) eliminated the need for four shuttle trucks and a driver, (6) simplified work for the supervisor of these operations, and (7) released the old dock, on the opposite side of the plant, for exclusive use in handling less-than-carload shipments of meats and supplies.

The new 10-ft.-wide dock extends fully 220 ft. along the spur track—sufficient to accommodate five freight cars. And in addition, provision has been made for loading and unloading a trailer-truck at one end of the dock. Thus, there is no longer any need to use the public team-track two blocks off. Instead, carcasses, from either freight or trailer, are now conveyed directly over the bridge into the top-floor cutting room of the main plant, and thence to the different processing departments. Outgoing products travel in the reverse direction, being moved by tractors.

Like the dock, the new overpass is 10 ft. wide. It runs a total of 120 ft., about half of this length going

through the new two-story cold-storage warehouse. The structure is of attractive brick and glass blocks.

Incoming meats are now unloaded in this simple manner: Trailers are backed up to the end of the loading deck and freight cars alongside it. Then the carcasses—beef, veal, hog or lamb—are unloaded and hung on hooks attached to a trolley riding an overhead monorail. Initially, the trolleyed meats are pushed to the center of the deck for inspection and check-weighing on electric reweigh scales. Then, after making a right-angle turn, they are pushed onto a power-driven trolley that goes through the overhead pass directly onto the cutting room floor.

Bulk-packed items, like frozen livers, kidneys and poultry, are unloaded from freight cars and trailers, put into four-wheel metal carts, and pushed through the overhead pass into the different departments.

Through this same aisle, alongside the powered trolley, outgoing company-processed items move in the opposite direction. Products going to points within a 200-mi. radius of the plant are first assembled in carload lots, ready for shipment. Cased goods —fresh, frozen, canned or smoked— are stacked on pallets, and other items on four-wheel flat trucks. Fork-lift trucks and tractors then transport them via the overhead pass to the new dock, where they are loaded into freight cars or trailers.

The old method of handling meats in and out of the plant required six men. Four did the loading and unloading, another supervised the work, and still another shuttled the trucks between team-track and plant.

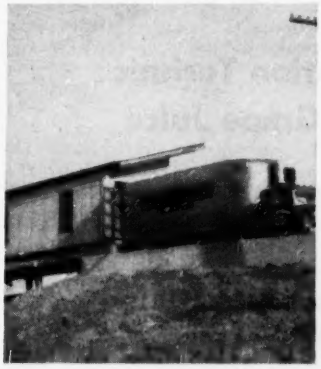
The new system has eliminated the services of the driver and the need for the shuttle trucks. It also simplifies the supervisor's job—he now oversees loading and unloading operations at just one location, instead of two. For example, when carcasses formerly were unloaded at the team-track and then trucked to the plant, the supervisor had to travel with his men between both places—the team-track and the loading platform at the plant. But now, the supervisor remains stationed at the new dock, where loading and unloading can be carried out.

The company's old dock is now being used for unloading four trailers containing less-than-carload shipments. In addition, this dock has been enlarged to accommodate two trucks delivering equipment and supplies, such as casing, spices, packaging materials, and the like.

In summary, there's a worthwhile tip to be taken from the experience of this Baltimore packer: If some problem finally proves insurmountable on its own level, there's always the possibility that it can be solved on some other level. In short, materials that can't be efficiently moved on the surface may be moved over or under it. Goetze picked the "over" way.

OUTSIDE—

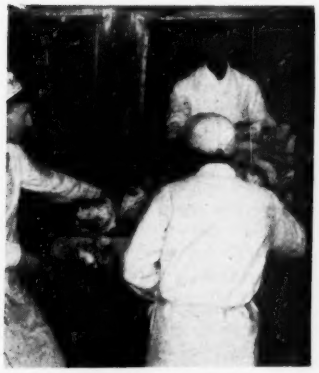
Serves freights . . .



. . . also truck-trailers

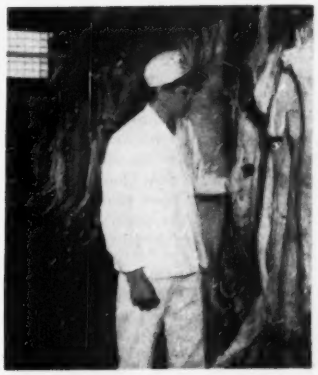
Connection: Direct

—AND INSIDE



Meats from reefer . . .

. . . and trailer . . .



. . . trolley-in via bridge

OUTSIDE VIEW

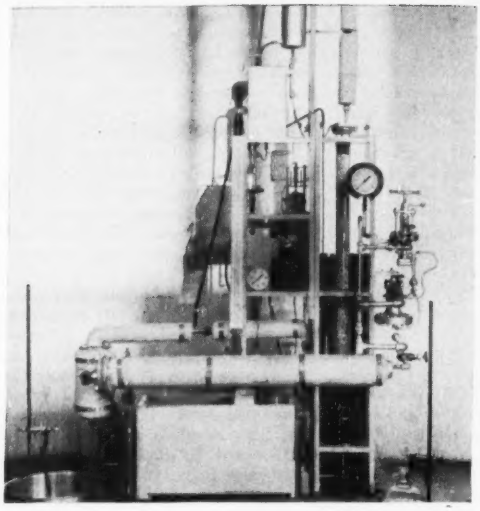


FIG. 1. **UNIT** used for recovery of volatile essences in two-pass method. Compact assembly is portable.

INSIDE WORKINGS

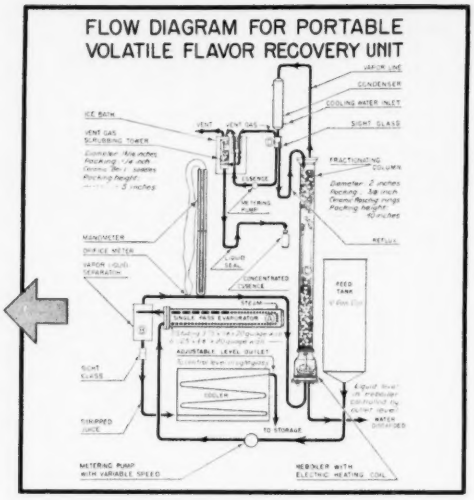


FIG. 2. **HOW** component parts function. Flow through apparatus is diagrammed (text explains letters).

Two-Pass Concentration Technic Obtains Full-Flavor Grape Juice

One-stage recovery of volatiles, even at 48 percent vaporization, found inadequate. Second essence does the trick

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A Concord grape juice concentrate that has been produced by the Eastern Regional Research Laboratory reconstitutes with water into a product which has the full flavor and aroma of the original juice.

For the production of this concentrate, ERRL determined that the volatile flavors or essences of the fruit had to be recovered in two stages. These two essences are then blended with the concentrated stripped juice.

The first studies made by the Laboratory were on apple juice.* And from the interest shown in this work, the Concord grape, because of the size of the industry and the value of its products, was the next fruit selected for study.

The apparatus employed (Fig. 1) was essentially the same as that used for recovery of volatile flavors from apple juice. From 100 gal. of juice, the essence recovery process as applied to apple juice produces 10 gal. as vapor, leaving 90 gal. of "stripped juice." From the vapor are produced 1 gal. of essence and 9 gal. of water; the latter is discarded. To make a syrup concentrate, the stripped juice is evaporated under vacuum to about 15 gal., thereby removing 75 gal. of water. The concentrate and the essence are then mixed to form a full-flavor concentrate. Let us now consider the modifications in this procedure necessary to adapt it to grape juice:

Attempts were made to obtain a grape essence which would have a character and potency sufficient to enable the preparation of a full-flavor concentrate as good as the original juice. With vaporization percentages even as high as 48 percent, the addition of the essence, so obtained, to a concentrate made from the stripped juice was not quite adequate.

The resulting concentrate, when properly diluted, made a juice which had somewhat less flavor and aroma than the original juice, though its character was typical of that juice. Since the distillate obtained during the vacuum concentration of the stripped juice had a characteristic grape juice odor, our efforts were then directed toward processing this distillate into a second essence.

Because recovery of essence from this distillate is necessary in order to avoid loss, there is no point in carrying the first vaporization to any such extreme figure as 48 percent. Thus, for production of a full-flavor concentrate, the vaporization used in obtaining the first essence may well be limited to 20-25 percent of the juice.

Add Second Essence

The stripped juice is concentrated under vacuum, and the distillate obtained is passed through the essence equipment, where it is vaporized 20-25 percent to give a second essence. These

* Howard P. Milleville and Roderick K. Eskew, *Recovery and Utilization of Natural Apple Flavors*, USDA, Bur. Agr. & Ind. Chem. AIC-63, (Eastern Regional Research Laboratory) Sept. 1944, with Supplement of Apr. 1945. (Processed). Also, Howard P. Milleville and Roderick K. Eskew, "Recovery of Volatile Apple Flavors in Essence Form," *Western Canner & Packer*, Oct. 1946.

first and second essences are then added to the concentrate.

In the pilot-plant studies we determined the following significant facts:

1. A 20 to 25 percent vaporization of juice, removes, as nearly as can be determined organoleptically, all volatile flavors that can be driven off by rapid atmospheric evaporation.

2. Exposure to heat that essence-bearing vapors undergo in fractionating column and overhead system, namely, a minimum of 12 min. at approximately 212 deg. F., does not perceptibly alter flavor of reconstituted juice.

3. When producing 100-fold essence from these vapors, if vent gases are scrubbed with this essence after cooling it to 40 deg. F., loss of volatile aroma in vent gases is rather small. Term "fold" is defined as number of volumes of juice processed in making 1 volume of essence. Folds above 100 have not been investigated, but should be easily attainable with good results.

4. A continuous fractional distillation column of two plates or equivalent, with vapor feed, is all that is required to effect satisfactory production of 100-fold essence; a small reboiler at base of column is sufficient to prevent loss of flavors in waste water from bottom of rectifying column.

5. Concentration of "stripped juice" in a single effect vacuum evaporator employing a surface condenser yields, in addition to concentrate, a distillate having a characteristic Concord grape juice aroma. This is true of juices stripped at vaporizations even as high as 48 percent.

6. By processing this distillate in the essence recovery apparatus, vaporizing 20-25 percent, a "second" essence is obtained.

7. The two essences recombined with concentrated juice from which they were obtained form a full-flavor concentrate. This concentrate can be reconstituted with water to make a juice which, for all practical purposes, is equivalent to original juice.

Rapid Vaporization and Preheating Juice

To insure good recovery of the aroma in the first step, it is necessary to vaporize from 20 to 25 percent of the juice. The heating and vaporization should be rapid enough to avoid alteration of the flavor. For this purpose, the juice was pumped through a single steam-heated tube in which it was heated to its boiling point and the vaporization carried out. The retention time of the juice in the tube, using a steam pressure of approximately 15 psi. on the evaporator steam chest, was approximately 3.5 to 4.0 sec. The total time for heating, vaporizing, and cooling back to room temperature is 20 to 30 sec.

In our pilot-plant apparatus, the evaporator tube (Fig. 2, A) is fed with cold juice. The first portion of the tube acts as a preheater and the later portion as an evaporator. The point in the tube at which preheating is completed and evaporation commences will vary with the operating conditions.

This variation sometimes causes cyclical changes in the amount of vaporization and consequently pulsations in the flow through the tube. With a single tube, this can be reduced to a reasonable amount by the use of a throttling valve between the juice pump and the evaporator.

In a large commercial installation in which the rapid evaporator consists of a number of tubes in parallel, this purpose can probably best be served by a high-velocity preheater placed ahead of the evaporator and controlled to heat the juice uniformly and close to 212 deg. F.

By the vaporization, the juice becomes an intimate mixture of vapor and liquid, which must be separated. This separation is accomplished by a centrifugal separator (Fig. 2, B), from the bottom of which the unvaporized portion ("stripped juice") is removed.

A small amount of entrained juice in the vapor leaving the separator can be tolerated, for the sugar and other solids which it contains will subsequently be removed in the fractionating column. Juice so entrained is lost, however, for it will be discarded as a dilute solution in the bottoms product from the fractionating column.

Fractionation of Vapors

In the vapors, the volatile flavoring constituents are present in a concentration only 4 to 5 times that of the original juice. Since this relatively dilute product would be difficult to utilize commercially, the vapors are further concentrated in a fractionating column.

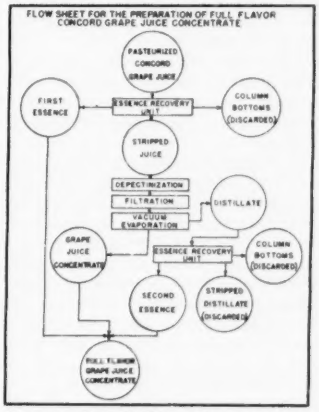


FIG. 3. SEQUENCE of operations. Note steps leading to second essence recovery.

They pass through a metering orifice into the bottom of the fractionating column (Fig. 2, C). In the pilot-plant column, a depth of 3½ ft. of porcelain Raschig rings of ⅜-in. dia. was found sufficient to effect a further 20 to 25-fold increase in concentration of volatile flavoring constituents; that is, to 100 times that of the original juice.

The vapors from the top of the column pass to a total overhead condenser. Condensed, they go to a reflux splitter or sight glass (Fig. 2, D), whence the essence is withdrawn at a rate of 1/100 that of the feed juice rate. Remainder of the distillate returns through an overflow as reflux to the distillation column (at a temperature of 170 to 190 deg. F.). A small heating coil or reboiler at the base of the column strips off any volatile flavors from the waste water before it leaves the bottom of the column.

Vent Gases Scrubbed

The juice fed to the essence equipment contains dissolved air and other gases. These pass to the fractionating column with the vapor, and must be continuously vented to the atmosphere.

To reduce the amount of volatile flavor substance carried away by these gases, they are passed up through a small scrubbing tower (Fig. 2, E), down which flows the final essence. Both the essence and the gases are cooled by ice or refrigeration before entering the scrubber, therefore the gases carry away only such small amounts of volatile materials as will saturate them at 32-40 deg. F.

If ice water instead of essence is used in the scrubber, there should be no loss of volatile flavors in the vent gases. The liquid leaving the scrubber can be returned to the column with the entering vapors, so that its essence content will be recovered. If a source of fresh odorless water is not available, or if for any reason it is undesirable to have water enter the system, the effluent from the bottom of the fractionating column can be chilled and used for this purpose.

For some juices, such as apple juice, use of water in the scrubber is an unnecessary refinement, because the vent gas from an essence-fed scrubber is odorless. For grape juice, however, the additional complication of supplying chilled water or column bottoms to the scrubber may prove justifiable.

Operation and control of the process are simple. The two constant-rate liquid pumps, one on the feed juice line and the other on the essence line, are set at the desired predetermined rates. For instance, to obtain an essence of 100-fold concentration, the essence pump is set at 1/100 of the rate of the juice pump. The amount

of vaporization, as measured by the orifice and manometer on the vapor line from the separator to the column, is controlled by regulating the steam pressure on the evaporator.

Equipment Described

Now for a brief description of the parts of the essence recovery unit used in this work (Fig. 1 and 2):

It has a working capacity of 5 gal of juice per hour at a vaporization rate of 20-25 percent. The feed tank—10-gal. capacity—is constructed of stainless steel. The metering pump, also made of stainless steel, is a gear pump with variable-speed drive. It is calibrated in terms of gph. vs. rpm. and discharge pressure.

The rapid atmospheric pressure evaporator consists of a preheating section, 3.75 ft. of ¼-in. stainless steel tubing with 20-gage wall; vaporizing section, 1.25 ft. of ⅜-in. stainless steel tubing with 20-gage wall; and steam chest, 2-in. IPS pipe provided with steam-regulating valve and condensate line.

Separator has a 4 in. dia., is 10½ in. high, and the height of inlet pipe is 7½ in. Inlet pipe is tangential to inside face of separator. The unit is all stainless steel.

Orifice meter comprises a sharp-edged ¼-in. dia. orifice connected to a water manometer calibrated in gph. of feed vaporized.

Distillation column is made up of 40 in. of ⅜-in. Raschig rings in a 2-in. dia. glass pipe. Reboiler is fitted with 500w. immersion heater.

Overhead condenser consists of a block tin coil having 0.26 sq. ft. of cooling area.

Product metering pump, capacity 16 gph., is a bellows-type positive displacement unit with external ball check valves.

Vent gas and product cooler is comprised of stainless steel tubing coils immersed in an ice water bath. Tubes have sufficient length to cool gas and liquid to 40 deg. F. or lower.

Vent gas scrubbing column has 5 in. of ¼-in. Berl saddles in a 13/16-in. dia. glass column entirely immersed in an ice water bath.

Procedure Detailed

In typical commercial manufacture of Concord grape juice, the grapes are washed and stemmed, resulting in at least partial rupture of the skin. The stemmed fruit is next transferred to a cooking tank provided with a steam jacket or coils. Here, the batch is agitated, and its temperature is raised to 130 deg. F. to develop the full characteristic Concord grape juice flavor, aroma and color. During this operation, further disintegration of the structure of the grapes occurs.

When the desired temperature has been reached, the batch is transferred, without cooling, to folded filter cloths on hydraulic press. The hot pressed juice is next pasteurized by heating to 165 to 180 deg. F., and immediately put into containers for storage. The containers are sealed and held at room temperature for 3 months to 1 year, primarily to precipitate the argol before additional processing or bottling.

The essence recovery step should obviously be applied at the processing stage at which the flavor is most fully developed. In tests made at a factory using the processing methods described above, it was found that the volatile flavors were stronger after pasteurization than at any preceding stage. Processors who age the juice to enhance its flavor and to precipitate excess argol would logically strip the essence at the completion of aging. During vacuum concentration of the stripped juice, some additional precipitation of argol occurs. With our juice, it was found that a slightly better taste resulted if this precipitate was returned to the concentrate.

Our pasteurized Concord grape juice was 20 to 25 percent vaporized to generate 100-fold first essence, as has been described. The bottoms from the fractionation column were discarded, and the stripped juice was collected (our laboratory steps are indicated in Fig. 3).

Pectin Destroyed

A pectinase enzyme was added to the stripped juice, and it was allowed to stand overnight for the complete destruction of the pectin. To destroy any excess pectinase, the juice was then heated to 140 deg. F. (with steam at atmospheric pressure) in a jacketed stainless steel kettle. It was immediately filtered on a stainless steel press using filter cloth precoated with filter-aid. Then it was passed to the evaporator for concentration.

The evaporator was of the calandria type, with a surface condenser and suitable receivers. All metal in contact with the liquid and vapor was stainless steel.

At a working vacuum of 27.5 to 28.0 in. of mercury, corresponding to batch temperatures of 99 to 109 deg. F., the juice was evaporated to a density of 65-70 deg. Brix to form a concentrate. At this density, the concentrate is self-preserving against fermentation. Commercially, if the final product is to be marketed frozen, concentration need only be carried to about 50 deg. Brix.

Second Essence Prepared

The composited distillate collected from the surface condenser during the evaporation was fed to the essence equipment. This was operated at 20 to 25 percent vaporization and 100-fold "second" essence was made. That is, 1 gal. of essence was drawn off per 100 gal. of distillate fed. Both the column bottoms and "stripped condensate" were discarded, both being essentially distilled water.

A numerical example will illustrate the quantities of the various components: If the essence equipment were operated at the 100-fold adjustment, from 100 gal. of 14 deg. Brix grape juice, there would be obtained 1 gal. of first essence, 0.6 gal. of second essence and 16.25 gal. of concentrate (58 deg. Brix). Combined, these would give 17.85 gal. of full-flavor concentrate which, on the addition of 82.15 gal. of water, would yield 100 gal. of reconstituted juice.

In commercial practice, if the essence recovery units and the juice concentrator are running continuously, it is a simple matter to combine the two streams of essence to form a mixed essence. In the instance cited above, the "fold" of the mixed essence—(i.e.) the number of gallons of juice processed in obtaining a gallon of essence—would be $100/(1 + 0.6)$, or 62-fold.

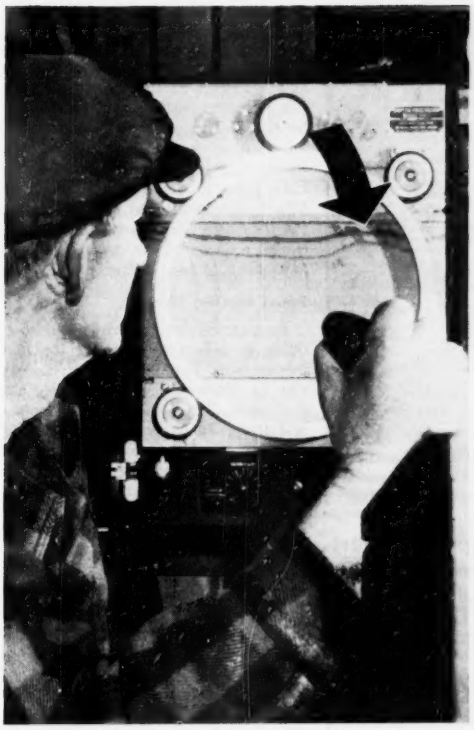
This essence could then be labeled "62-fold," or more simply "Mixed Essence 1.6/100", indicating that 1.6 gal. of it was made from 100 gal. of juice, and hence 1.6 gal. is the amount to be added to the concentrate made from 100 gal. of juice. If, however, the first and second essences are stored separately, they would be designated "First Essence 1/100" and "Second Essence 0.6/100", respectively, and used in these amounts.

Comparative Tests Made

Examinations of reconstituted juices in comparison with original juices (by such means as threshold dilution tests to determine the strength of the essences, and evaluation of flavor quality by a trained taste panel) indicated that the reconstituted juices were, for all practical purposes, indistinguishable from the original juices. The absence of pectin (removal of which is necessary to form a 65 deg. Brix concentrate of reasonable fluidity) did not impair the flavor of the reconstituted juice. Such absence was undetected by most of the taste panel. Storage tests on the full-flavor concentrate are being made at room temperature, in the cold, and in a frozen state.

Reconstituted grape juice prepared by the foregoing method differs slightly from commercial bottled grape juice in that the latter usually contains enough added sugar to increase the Brix from about 15 to 17 deg. Thus, to match the bottled product, sugar must be added. It can be put into the juice conveniently after the first essence has been stripped from it.

"There they are, and . . .



SKIPPER GOODWIN spots two schools of menhaden (arrow) on recorder installed in his ship's wheelhouse.

. . . here they come!"

FULL NET proves accuracy of new technic. Time is saved and costs cut in quick "spot and catch" operations.

Electronics Takes "Guess" Out of Fishing

Graphic "pictures," charted by sound waves, now locate the schools swimming below—meaning more fish in the net and more profit in the operation

SINCE shortly after the end of World War II, electronics has been adding something entirely new to the age-old business of commercial fishing.

True, there hasn't been much fanfare about it, but fishermen in virtually every phase of the industry—from New England's sardine waters to the shark beds of Florida and the rich herring banks of Norway—have been gradually turning from the traditional methods of finding fish to the use of an electronic device that puts striking new accuracy into the fish-spotting art.

This scientific equipment finds the fish by means of sound waves, utilizing the principle of echo sounding. And it is a navigation aid, as well.

With it, fishermen are reported to be catching more fish than they ever have caught before—sometimes in wholly unexpected places. What's more, the word has it that they're doing it in less time, with less effort, and at a good saving in operational costs.

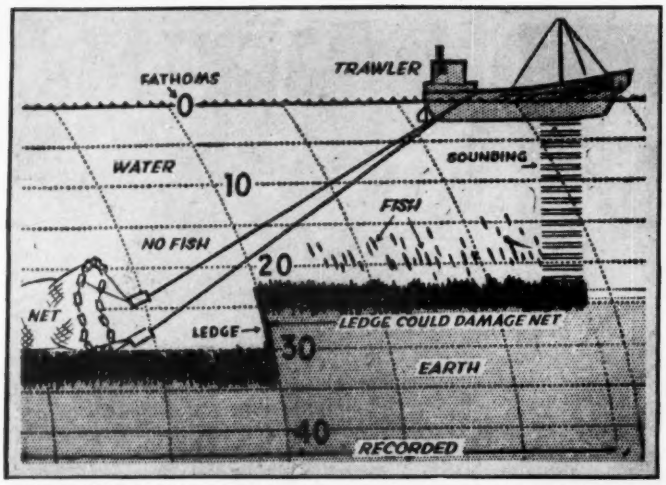
Captain Roy Goodwin, skipper of a menhaden boat operating out of Beaufort, N. C., estimates, for example, that by using a recorder he caught about a million more fish last year. A fleet owner in Portugal discovered—within a mile of his docks—enough sardines to keep his factory busy for a week. And a fisherman in Vancouver, B. C., reports his "eye" enabled a record six-day catch worth more than five times his recorder investment.

Last year's fishing annals tell of many similar experiences. To a large degree, this new device takes the gamble out of commercial fishing operations. It not only locates elusive schools, but tells the fishermen the approximate size of the school, how deep it is, the point of greatest concentration, as well as the speed and direction the fish are moving. Quite often, it enables the species to be identified, since certain fish school in characteristic patterns.

Draws a "Picture" of Ocean Floor

Putting a recorder on a boat "parts the curtain" to reveal to the skipper what lies under the water. The recorder scans the ocean beneath the boat and draws, in chart form, an ac-

How System Operates



THIS DOWN-BELOW cross-section shows way it's done. Sub-water features are scanned by echo-soundings, then sketched out on revealing graph in trawler.

And Closeup of a Chart

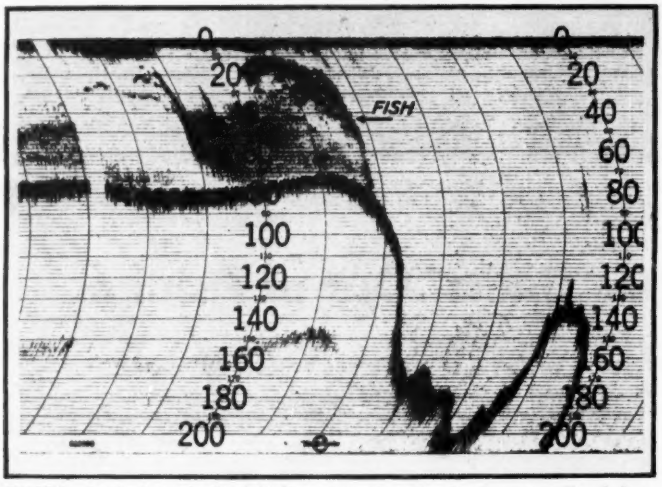


PHOTO of actual graph. Straight line at top is water level, uneven line below is the bottom, and smudges in between are fish. Charts are saved as records.

curate picture of bottom conditions. It notes the presence of everything that has greater density than the water. Along with schools of fish, the instrument shows the ocean floor's hills and valleys, submerged rock pinnacles, submarine snags, old shipwrecks, and other underwater hazards. Thus it serves as a navigation aid, enabling fishermen to avoid damage to boats and costly nets. This is an important factor in building and safeguarding a profitable operation.

The instrument was developed during wartime by the Pacific Division of Bendix Aviation Corp. at North Hollywood, Calif. Known as Bendix DR's (depth recorders), the units range in price from about $1,000 to $2,500.

Although it was not until 1946 that the first unit was installed on a fishing boat, already more than 2,500 American fishing craft have them. Old-time fishermen, with characteristic adherence to traditional methods, initially were skeptical of the electronic development. Some showed resentment. But today this resistance has faded in the face of the large recorder-catches of sardines, tuna, herring, haddock, cod, mackerel, shark, albacore, and shrimp.

Typical is the trend in New England's sardine industry, where 65 percent of the major sardine boats are now equipped with the electronic eyes. Canneries as well as fishermen have benefited. In fact, New England sardine canneries, eager to increase their business by boosting the annual catch, have gone to considerable length to help independent boat owners acquire the recorders. One large canner purchased a dozen of the instruments and gave them to boat owners!

Europe Adopting Them

Foreign fishermen have been just as quick to take advantage of the new fishing aid. Instruments are now in use in Norway, Denmark, Belgium, Portugal, Greece, Germany, France and Italy. In Norway, more than 200 of the "eyes" are now in use. The Norwegian distributor reports that the recent demand has necessitated allocation of the instruments to fishermen under government supervision. And although short on dollars, the Norwegian government plans to spend an additional $300,000 on the recorders.

Cuba's entire major-vessel fishing fleet of 60 ships was equipped last year to help alleviate a threatened food shortage. Since the island's limited acreage is, of necessity, largely devoted to sugar, tobacco, and other agricultural products, little land suitable for raising livestock is left. And a regular fare of imported meat would "run high" for the average family. So the country relies heavily on fish.

Big Catch in Cuban Harbor

Last year, a prolonged scarcity of fish on known fishing grounds was encountered. Seriously concerned, representatives of the fleet, which is privately owned by the Cooperativa de Armadores de Barcos Pesqueros de la Habana, arranged for a depth recorder trial. Tons of fish were discovered and caught right in Havana harbor. The fleet had been passing over them daily without knowing it.

The demonstration was so impressive that, as a public service, funds were appropriated by presidential decree to equip every boat. As a result, vessels that previously had spent more than two weeks at sea, returned fully loaded in half that time.

Back in 1946, the total U. S. fish catch was approximately 4,300,000,000 lb. But last year, according to Bureau of Fisheries' estimates, the catch was upward of 4,500,000,000 lb.— an increase of 200 million. The foreign catch also has been going up. In Western Europe, for example, the 1948 catch was estimated at 12,300,000,000

lb., an increase of 10 percent over 1947.

While no specific statistics are available to show what part the recorders have played in this trend, they unquestionably made an important contribution. As more and more boats are equipped, it is reasonable to expect that the trend will continue upward. The end result will be a more abundant supply of wholesome food for a hungry world, lower prices consistent with an increased supply, and a less arduous life and more reliable income for fishermen.

While a depth recorder may smack of magic to an old-timer, it actually is one of the simpler applications of electronics. It works on the well-established echo-sounding principle—the technic of measuring the depth of water by gaging the time required for a signal to be sent to the bottom of the ocean and return.

The recorder sends high-frequency sound waves (50,000-cycle waves, above audibility range) down into the water from the bottom of the boat. Fragments of signals bounce, or echo, back from whatever they hit. The returning echoes are picked up and amplified by means of electronic tubes, then are recorded on a horizontally moving chart. The result is a continuous, permanent "picture" of the ocean over which the boat is passing—the ocean floor and everything between the ocean floor and the bottom of the boat.

The equipment consists of two main parts—a recording unit and a transducer. The former, about the size of a household medicine cabinet, is usually installed in the wheelhouse or other convenient location, while the latter unit is fitted on the underside of the craft to send and receive the signals. By using the known speed of sound in water (approximately 4,800 ft. per sec.), the unit automatically measures the depth of water by the time required for the echo to "bounce." It measures the depth of a school of fish similarly. Recordings can be made either in feet or fathoms.

After the time lag between the sending of the signal and the reception of the echo is automatically computed, the information is passed on to an electric stylus in the recording unit. The stylus burns through an aluminum oxide coating on a special carbon-type paper that is used for the chart. The water level appears as a continuous straight line on the chart. The ocean-floor line is also continuous, but zigzags up and down according to the contour of the bottom. Schools of fish appear as dark smudges. Being permanent, the charts can be preserved as records of fishing voyages and bottom conditions in fishing areas.

An interesting comparison of the old and new is found in the northern Pacific. There, herring fishermen find the schools in the traditional manner—by standing in the stern of a scout boat and "sounding" with a weighted line. When a school is encountered, the fish literally telegraph their presence by bumping into the line, and experts believe they can determine the point of greatest density by the frequency of the vibrations.

Called "strikers," the specialists at this spotting are hard to convince that any device can challenge their skill. One of the weaknesses of the striker's system, however, is the limited area his line can cover. When, last fall, a skipper announced that a school of herring had appeared on the graph of the electronic recorder, one striker refused to believe it. He insisted no fish were there. But they were—at 200 ft., too deep to be reached by line. The ship hovered in the vicinity until the fish rose to 80. Then the striker felt them, and 500 tons were netted.

Shark Industries Division of the Borden Co., which operates a fleet of more than 20 boats south of Stuart, Fla., especially around the Florida Keys, began using depth recorders about a year and a half ago. Sharks, which yield a liver extract rich in vitamins, are among the few fish that can't float. When they rest, they lie on the ocean bottom, preferring the muddy sections. Electronic recorders accurately locate the mud bottoms, enabling the lines—10,000 ft. long—to be laid where sharks are most likely to be. Although the company still is in the process of equipping its boats, it already is reported to have increased its catch by 50 percent.

Depth recorders have paid for themselves in unexpected ways. Fred Brownlee, skipper of the shark boat, *Dusky*, one of the Shark Industries fleet, had to cut the 10,000-ft. line he had set last fall when a hurricane struck off Key West. Three days later, using his depth recorder charts from the earlier trip, he returned to the area and readily located and hooked his lost gear—worth $2,500.

Boon to California Fishing

Ability of the recorders to locate even the smallest fish proved a boon to hook-and-line fishermen off Southern California last summer. For two years these fishermen had been hampered by a shortage of live bait. Many feared the small bait fish were disappearing. Then a depth recorder was installed on the *Tarpon* out of Newport Bay. Just outside the breakwater, the eye located dense schools too deep to be seen with human eyes. One school was so large it required seven minutes to pass under the boat. This news was flashed to three bait seiners that had cruised over the schools that morning without suspecting the fish were there. And their catch supplied 27 fishing craft.

Significantly, despite the increased catches wherever depth recorders are used, marine scientists see no danger of the fish supply ultimately being exhausted as a result of the electronic development. On the contrary, they believe the recorders will be of great value in conservation, since they will make possible a greater knowledge of fish life, hence more selective fishing, and more extensive research.

Used on Floating Laboratories

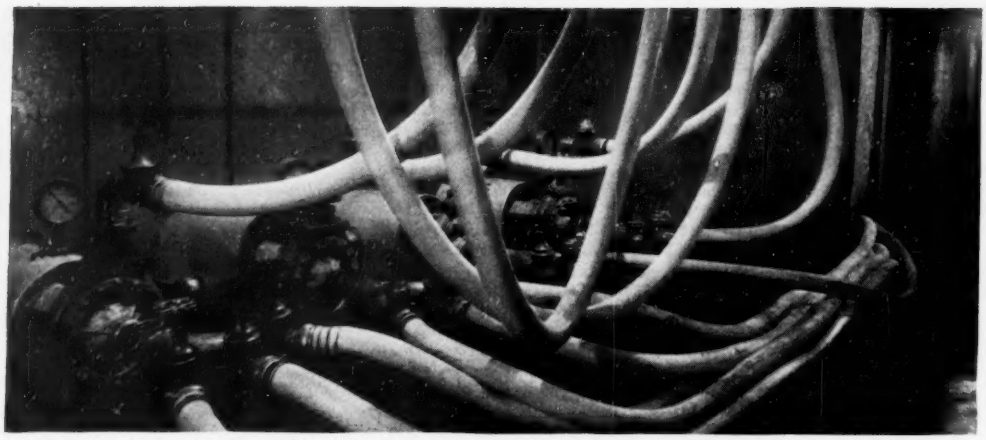
A problem in point is that of the West Coast sardine industry, where the catch has dwindled since the war from a 1,000,000,000 lb. to barely 300,000,000 lb. annually. Nobody knows what has happened to the sardines, but the State of California intends to find out. State funds financed conversion of two former Coast Guard ships into floating laboratories operated by the University of California and the Scripps Institute of Oceanography. With recorders, they are following the remaining schools, studying their life and habits. This knowledge eventually will be utilized in drafting measures for conservation.

The Van Camp Sea Food Co., tuna packer of Terminal Island, Calif., is also carrying on a continuous research program with help of the eye.

On the Atlantic seaboard, the nation's only deep-sea research ship, *Albatross III*, is using recorders in studies aimed at conservation of the New England fishing industry. The Maine Fisheries Department recently commissioned a new research vessel equipped with a recorder. A research vessel operated by the Marine Laboratory of the University of Miami employs the new development to search for sponge beds and for shrimping grounds. And in northern waters, the Atlantic Herring Investigation Commission of the Canadian government is employing recorders in survey work.

Only recently the U. S. government purchased from fleet owners a dozen large trawlers, about half of them recorder-equipped. They were reconditioned and then sent to Germany in an effort to rehabilitate that country's war-shattered fishing industry.

All things considered, the advent of the electronic fish finder appears to be one of the most important advancements in commercial fishing methods. Granted, its full import will not be known for several more years. But in the meantime, it presages a brighter future for both the fishermen and the hundreds of thousands of other people who depend upon the commercial fishing industry for a livelihood.



HERE, rubber hose carries beer. The desired flexibility of the lines is obtainable through the use of rubber.

Rubber Plays an All-Around Role

It can carry your products, liquids or solids. It can guard them. And in numerous ways it can service both your plant and equipment

FRED W. BARLOW
Pittsburgh, Pa.

The versatile properties of rubber make it highly desirable for many applications in food processing operations. What these properties are, and how, why, and where they bring greatest advantages are pertinent points to be considered by the plant man.

Nearly all the commercial rubbers have essentially the same valuable qualities for food processing. Desirable properties are summed up below:

1. Rubber has high resistance to bacterial and fungus growths. Although compounding it to have marked fungicidal and bacteria killing power may be difficult, rubber does not foster such growths. And its smooth surface provides few if any pits for their lodgement and multiplication.

2. It is easily cleaned by spraying with water or steam and, when crusted with dirt, by brushing with common alkaline cleaning agents. Furthermore, it is not attacked by these purging materials.

3. Deterioration of rubber in many cases is only a fraction of that experienced with other materials. Properly compounded it is not affected by syrups, brines, many vegetable and animal oils, alcohols, acids, and as stated alkalis.

4. A most important characteristic is rubber's ability to return almost completely to its original dimensions after compression, tension, or shear. Thus rubber can absorb vibration, cushion materials against shock, store up energy, and bend easily.

5. Excellent abrasion resistance can be secured with rubber. Some tire treads have been run over 100,000 mi. With more and more materials being conveyed pneumatically, rubber's possibilities for ducts or for duct lining, should be investigated by food processors.

6. Colored rubbers can be obtained for identification purposes or for esthetic reasons. Recent developments in pigmentation—for instance, the commercial use of "white carbon black" (silica)—have extended the range and versatility of colored rubber products.

7. Rubber molds easily, due to its plastic nature, and it can be economically extruded in a wide variety of shapes and sizes.

8. It can be treated to minimize its odor and taste imparting properties. It is observed that brewers soak their hose lines for a short while in the fluid to be conveyed before placing them in service. Among the various rubbers, Thiokol may be pointed out as an exception, in that its odor, similar to hydrogen sulphide, makes it objectionable despite its unparalleled resistance to organic solvents.

A word now about what harms it: Main enemies of rubber goods are exposure to direct sunlight, especially when the rubber is in a stretched state; ozone (largely from electrical discharges in nearby electrical equipment); and gasoline and oil. Occasional spills of petroleum products that are wiped off quickly will cause little harm.

Used As a Carrier

The application of rubber goods to solve food processing problems is well under way. Rubber belts are widely used, both for the primary purpose of material movement and for sorting operations. When used as elevator belts, angle irons or buckets are bolted on them to carry the load.

Inspection belts, usually white or light cream for easy visual product checking, can be of natural or GR-S (a synthetic) rubber. Readily cleaned, waterproof, and long lasting, they serve well with little trouble.

Two operating precautions should be observed. Handling of oily or greasy materials—say, pichards or fatty meat products—should be avoided, unless your supplier advises that the belt is satisfactory for such service. Neoprene is usually used in contact with fats and oils to prevent swelling.

Because of their cheapness and the

ease with which joints can be made, metal fasteners are frequently used on such belting. However, these fasteners corrode and also allow water moisture and other liquids to penetrate into and eventually weaken the cotton duck reinforcement, through the cut ends.

The value of using vulcanized splices to prevent such troubles should be considered.

Conveyor belts are believed to be the cheapest means of transportation per ton-mile when bulky materials must be moved in volume. By special surface treatments, such as fabric impression covers, conveyor belts can carry packages, ice, sliced fruits, and other products, up moderate inclines.

For the most satisfaction from conveyor belt installations, the rubber goods supplier should be called in when the first rough plans are made by the engineering department. The supplier's wide experience in material movement will assure an installation with maximum flexibility and utility.

Points to Check

Once installed, a short breaking-in period is required for the belt to stretch, adjust itself to the carriers, and run straight. If it continues to run crooked after this some points to check are:

1. The idlers. Some may be misaligned, frozen, or loose on the shaft. Any of these can cause crooked running.

2. The belt itself. It may not be straight. Check with the center line of the belt some distance back from the splice to make sure the ends are square. At times, worn belt edges stretch with heavy tension, or the exposed fabric may shrink when wet. Either condition results in crooked belts.

3. Loading of the belt. The load should be evenly placed in the trough of the belt. Perhaps the loading chute or hopper feed can be improved.

Another problem that may occur with both elevator and conveyor belts is slippage. Generally speaking, belt dressings are not the answer for this condition. But the coefficient of friction may be increased by applying rubber lagging to the pulley. Not difficult to apply, this lagging can be grooved to obtain still better traction.

Hose Used Extensively

Practically all food plants use rubber hose. Probably the most common kind is the water hose used for cleaning floors, screens and tanks. Hose is also often employed for transportation of syrups, brines, beer, vinegar, and other food products. Steam, air, and fire hose are also frequently used.

A very wide variety of hose is available from well established manufacturers. Special expensive constructions are rarely required. Hose up to 50 ft. in length is usually made on a mandrel. For this reason the standard hose length is 50 ft. Longer hose is made differently and is called long length, or lead press hose. In the smaller sizes—say ¼ in. i.d.—it can be obtained in lengths up to 1,000 ft. The larger sizes come in 250 ft. lengths. Hose is ordered by the inside diameter wanted.

Tolerances on diameters vary. Long length hose has greater tolerances than mandrel-made. In both cases, tolerances increase with increasing inside diameter. Usual tolerances for 1 in. i.d. hose are: 1/32 in. i.d. and o.d. on standard 50 ft. hose; 1/16 in. i.d. and o.d. on long length hose.

Hose used for clean-up purposes in food plants is variously called water, wash-up, creamery, or sanitary hose. Expensive grades are not required for this service, which is not unduly severe. Ordinary garden hose has been used, but is generally too flimsy.

It is best to use regular wrapped water hose with the correct number of plies of reinforcement for the line pressure—any rubber manufacturer can quickly give this information if the size wanted is specified. Steam hose should be used for cleaning with hot water or steam alone.

In dairies and ice cream plants where the hose cover is in contact with butter fat, vegetable oils, and the like, it is best to buy sanitary or creamery hose. Usually, but not always, this has a construction suitable for hot water and steam and a specially compounded cover for grease and oil resistance.

One desirable feature often overlooked when buying hose for this service is the availability of built-in nozzles. These are actual rubber nozzles vulcanized on the end of the hose. Although not available on long length hose, they can usually be supplied on the mandrel-made types. Main advantage of the rubber nozzle is that it will not injure such equipment as porcelain lined tanks if accidentally dropped. Furthermore, they seal off the fabric end of the hose and prevent liquids seeping back into the hose carcass and causing premature failure.

Beverage hose, also known as brewer's hose, vinegar, or wine hose, is specifically designed for food plant use. Made to impart no odor, flavor, or color to fluids, it is compounded to resist acetic acid in vinegar and, of course, to be non-toxic. This hose commonly has a white tube with a red, white, or black cover as the user prefers.

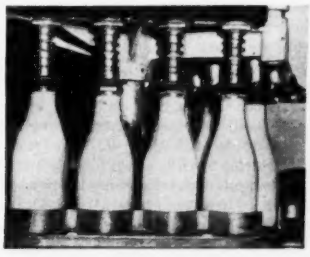
This type of hose, with reinforcing plies of cotton duck, is made in 50 ft. lengths on mandrels. The ends are capped with rubber at the factory to prevent any deteriorating action on the fabric exposed at the ends. Our lead photo shows this type of hose used in pumping beer and ale between storage and aging tanks. The hose gives flexibility in this operation.

One of the newer technological developments is plastic hose and tubing. Most of this is made from polyvinyl

Rubber Is Versatile

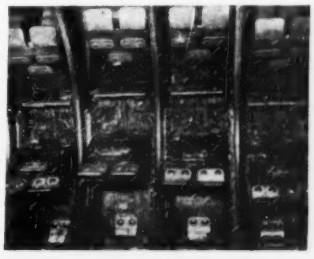
Conveying

This potato trimming line, in a freezing plant, uses rubber conveyor belts.



Filling

Metal-to-glass contact is avoided in this filler through the use of rubber.



De-Hairing

These rubber paddles protect the hog carcass during hair removal.

chloride, plasticized by various ingredients and stabilized against deterioration. It has been most widely publicized as a garden hose, emphasis being on its light weight, bright colors, and resistance to grease and oil.

For food plants, however, a careful check should be made regarding its suitability. In its present state of development, one should be sure that the hose will withstand usual line pressure and heavy surge pressures when valves are shut off quickly.

Furthermore, temperature changes should not affect the hose. It should not become stiff and hard to handle at low temperatures. Finally the plasticizer or stabilizer should not leach out to cause any toxicity or off-flavors.

Precautions for Long Life

Although present day hose is rugged and dependable, its service life can be lengthened by taking the following simple precautions:

1. Do not kink, tie knots, or allow sharp objects to strike the hose. Although these practices seem obviously harmful, it is surprising how often such treatment is encountered.

2. Use the hose only for the service intended. Although hoses may be similar in appearance, they are built differently and for specific uses. Air hose often has a neoprene tube to resist the deteriorating effect of the oil which runs through the hot hose to lubricate the air tool at the end. When an air hose is used as a water hose, it may become loggy, and the water will leach materials.

3. Use the right couplings, applied correctly. Although common long shank couplings are used for water pressures up to 100 psi. and steam and air pressures up to 50 psi., more specialized fittings are required for safety at higher pressures. A call to your rubber goods supplier for his recommendations will help you.

4. When using steam hose, turn the steam off at the inlet end first, so the vacuum from condensing steam will not tend to pull the tube off. This way the hose can rest between use. If flexing is frequent, use wire-wound hose (hose with a helix of wire wound round the outside). This will also prevent kinking.

5. After use with fluids, drain hose and coil it. If line is not to be used again shortly, store it on shelves in a dry spot away from oil drips and temperature extremes. The hose need not be pampered, but it should be kept away from banks of hot steam pipes or loading docks exposed to zero temperatures.

6. Fire hose is bought as a necessity by most plants, but it often seems to be neglected until the emergency arises. Normally used is a single-jacketed fire hose, with 2½-in. i.d. But to cope with air-borne organisms present in food plants, the type with the mildew resistant jacket should be obtained. At least once a year, it should be tested at its working pressure to check its condition. It should be re-rolled only after all the water has been drained out and the cotton jacket is thoroughly dry.

More Uses for Rubber

While hose and belting are the main rubber items in most plants, other rubber products of a more specialized nature may give new solutions to food plant operators' problems.

Rubber covered steel rolls are used in canning plants as corn huskers. Here, two parallel rubber rolls, inclined slightly from the horizontal, are rotated on their axes toward each other. The rolls are of 3 to 4 in. dia. and the surface is roughly fluted. The corn ear is placed at the higher end in the bite between the rolls, and while traveling down to the conveyor belt at the bottom, the husk is pulled off and down through the rollers to a waste pit. This operation does not injure the tender kernels.

Meat packers have found that hair can be removed from hogs efficiently using rubber in the beater paddles. The freshly killed animal is immersed in hot water for a few seconds. Then it is lifted into a cradle, where the carcass is scraped by steel fingers mounted on rotating paddles which press against the sides of the hog. The rubber part gives flexibility to the equipment and thus prevents serious flesh marking.

Moulded rubber parts are frequently helpful in food processing machinery. Typical is a rubber ring which comes down on the milk bottle top while the latter is being filled, preventing splashing and avoiding metal-to-glass contact and possible chipping.

For corrosive liquids or gases, rubber lined tanks, pipes, pumps, and valves should be considered. Usually, the rubber lining is applied in thin layers, then after the final layer is put on, the area is tested electrically to see that there are no pinholes. These are identified by a spark discharge in the testing operation. Corrosion by electrolytic action is therefore nil.

Rubber goods will in most cases serve well at temperatures ranging from 32 to 125 deg. F. The wide changes for specific conditions that can be brought about by compounding is evidenced in two types of hose—aircraft fuel hose and industrial steam hose. Aircraft fuel hose is regularly made to perform satisfactorily at temperatures down to —40 deg. F. and industrial steam hose is made to withstand 300 to 350 deg. F.

Much trouble is caused rubber manufacturers by unnecessarily close tolerances asked for on rubber parts. Tolerances applicable to metals cannot be used. Avoid asking for tolerances less than 0.010 in. and allow more if at all possible. After all, unless the rubber part is totally enclosed, it can be stretched and fitted. And it is a problem to measure rubber goods accurately to 0.001 in.

Further applications for rubber goods in food plants are numerous and have profitable possibilities. Rubber hose can mobilize clarifiers, homogenizers, tanks, filter presses, etc. Many temporary installations are quite feasible by the efficient use of steam and water hose.

The big potentialities of reducing noise and vibration by the use of rubber mountings are well known. Already there has been some standardization in the design of these parts and a wide range of sizes is available. More general adoption should cut the maintenance cost of machinery.

Recent technology has diversified the types of sponge rubber available and they are now generally divided into two types: (1) Either the natural rubber or the lighter latex-foam type and (2) the cellular rubbers. In the first type, the cells are largely connected to one another and they absorb water rapidly. The second type has separate, closed cells not connected with one another, and can be supplied in soft resilient sponge or in rigid form.

The softer grades can minimize breakage and bruising in handling such materials as shell eggs, glassware, and fruit. Sheets of sponge are being used successfully on truck floors to minimize bruising in hauling produce over rough roads. Hard cellular rubber may be of use as refrigeration insulation.

Usually thought of an an insulator, electricity conducting rubber is no longer a rarity. The conductivity is acquired by incorporating certain kinds of carbon black in the rubber to provide paths for the current through the rubber matrix.

This property of electric conductance can be improved from mere static conducting purposes to actual heating effects. This is ordinarily done by impregnating a square section of fabric with the conducting rubber, laying copper wires along two opposite sides connected with an electric plug.

A top and bottom layer of non-conducting rubber is placed on the fabric and the whole vulcanized together to form a "sandwich", which can serve as a flexible heating pad. Such a pad can maintain a temperature of 150 to 250 deg. F. and last indefinitely. Use of such "sandwiches" in the food industry can be left to the ingenuity of the plant manager.

We Think . . .

▪ Processors Must Fight Labor Monopoly in Food Field

Food processors may be called upon to fight for their industry and their country in future dealings with labor unions. At least they will if the plans of Bakery & Confectionery Workers International Union of America (AFL) are any indication of what's ahead on the labor front.

Early in May, this union was trying to force Continental Baking Co., which has 83 plants in 67 cities, into a nation-wide bargaining deal. And this was to be only the beginning. The union's eventual goal is industry-wide bargaining in the baking field. This would give the union the same kind of strangle hold on baking that John L. Lewis has on coal mining. And if this sort of monopoly control by labor can be established in one branch of the food industry, it is not unlikely that it would be tried in other branches.

We shudder to think what labor could do if it got control of the country's food supply. After all, people must eat regularly.

Fortunately, Continental's vigorous opposition caused withdrawal of the union's demand, for the present. And that is the attitude other companies must take toward such labor schemes if this country is to remain free. Thanks to Mr. Lewis, we all know how one man can dictate to the entire country—even kick the federal government and the courts in the teeth and get away with it. We also know how Lewis has forced the price of a product so high and made the supply so uncertain that an industry has lost a large part of its market.

In the past, bargaining in the baking industry has been on an area basis. And aside from the serious threat involved in nation-wide bargaining, it makes no sense on a practical basis. According to the Bureau of Labor Statistics, bakery wages vary from $1.88 an hour average in New York hand shops to 99c. in Chattanooga. Then there are different rates in hand shops and mechanized shops, as well as in different branches of the baking field. There even may be as many as three or four union rates for the same work.

These differences should be maintained to protect the smaller companies. It makes superficial sense to say that workers doing the same kind of job should receive the same pay regardless of the company involved. But such reasoning does not take realities into account. Some companies can afford to pay labor only so much and still be able to meet their costs. And if they go broke, business will suffer and employees will be thrown out of work.

There is one chink in the armor of the big union leaders: Many local labor leaders do not want nation-wide bargaining because it robs them of their importance. It would be well to keep them thinking in that direction.

▪ Regulations Make Good Margarine Package Improbable

Package designers who are supposed to provide the commercial art for food manufacturers will have to take a new course in layout and package label composition. Perhaps some will graduate from that course sufficiently skilled to meet all of the new requirements of the Food & Drug Administration while still providing an attractive package with eye appeal for margarine.

We are not quite sure that any of them will so graduate, nor do we know what the new packages will look like. Surely they will be different. Our doubt and our concern about this matter come from the new regulations for labelling of margarine as promulgated in mid-April by F&DA. These involve three single-spaced pages of details. They fix everything from the size of the individual letters of the label to the name of the commodity.

Incidentally, this commodity must now be called "oleomargarine" until the elaborate procedure for changing the identity standard has been carried out.

Much of the package designers' trouble will arise from requirements as to size and boldness of letters. The area occupied by each letter for the commodity name should equal or exceed the area of the largest corresponding letter elsewhere on the label. Thus, if there has been some fancy trade name or company brand indication in large letters, each of the letters in the word "oleomargarine" must be equally prominent. A circus poster will be a shrinking violet in comparison.

Furthermore, there must now be a complete statement of optional ingredients and of other characteristics, including the names of the oils used in manufacture. If vitamins are included, then the requirements for special dietary foods apply. And all of this, plus the usual mandatory information, should appear on *each* panel of the package label which may reasonably be exposed at point of sale.

The amendment of the law which was to give margarine some new freedom in the markets is thus imposed through meticulous administration by a flood of new and detailed requirements that do not make the manufacturers happy.

▪ More Should Be Done to Preserve Product Quality

Permanent markets for specific processed food products inevitably are based upon customer satisfaction. This means that the consumers must like the product and keep on buying it. Too often a modification of formula or of plant practice does not give adequate consideration to the effect of changes on keeping quality.

Recently there has been increasing attention to the question of loss in food palatability through reaction of the foodstuff with oxygen from the air. Various remedies have been tried, including the elimination of air by inert gas packing. Numerous and substantial benefits have been achieved, but not as many as could have been accomplished with a little more care.

Take just one example to illustrate a partial remedy which has proved to be no remedy at all:

It is well known that many edible oils and fats depreciate substantially faster when in contact with the air. Several firms have used inert gas storage or packaging of such oils, or of foods containing them. And in a few cases the results have been somewhat disappointing. In most of these instances, the improved practice apparently did not take account of the fact that there was considerable

oxygen from the air dissolved in the oil or food. That oxygen continued to function even though deterioration was slowed by inert-gas packaging or storage.

For full benefit in such cases it is necessary to remove dissolved oxygen, as well as to blanket the food with the inert gas. There are well-established methods for removal or displacement of both dissolved air and that which is merely blanketing the food. One should study these methods and choose the most appropriate if he expects to get full benefit from improved practices.

Aside from the question of deterioration of oxidation, there is need in scores of cases for complete analysis of the technical problem of food preservation. We all remember the spoilage of frozen foods in the early days when proper blanching was not practiced.

Most of us have stubbed our toes on similar secondary problems while trying to achieve a major result. Perhaps the trouble is that we are not fully appreciative of the importance of the whole field of food technology. Broader thinking and deeper digging into the fundamentals of a problem often will make effective the efforts which are failures when given only partial analysis.

A casual effort does not justify the conclusion: "It won't work!"

▪ Death of Dr. Kokatnur Recalls Unique Milk Preservation Method

In the passing of Dr. V. R. Kokatnur, a familiar figure around New York has gone. Although his professional activities were generally outside the food field, he once had a go at milk preservation in a manner that mystified many firms, but seemingly nothing ever came of it.

In the early 1930's if memory serves, he offered his invention to various firms in the dairy and milk container field. One research director held a pint of milk on his desk in an open container for many weeks—until the milk had evaporated to near-dryness. Yet it never soured, nor did it putrefy. When asked for further information, the research director was much embarrassed. He had to admit that all attempts to analyze the milk revealed absolutely nothing unusual. Yet the milk would not spoil in any way except dry up!

Shortly thereafter, we asked Dr. Kokatnur if he was at liberty to divulge the secret of his milk preservation. He was. With considerable glee, he explained that he had made a peroxide from butterfat, that all peroxides were more or less germicidal, and that his butterfat peroxide was unusually effective as a preservative of milk. The mystery was very simple, and here he paused to chortle. This peroxide was so unstable that the laboratory manipulations of analytical chemistry would destroy it, leaving only butterfat. His plan to exploit his invention was to ship preserved milk in unrefrigerated tanks, hold it at room temperatures until time for sale, then pasteurize to destroy the peroxide. That would leave normal milk, to be handled in the usual way *under refrigeration.*

Kokatnur's milk samples had the rapt attention and very anxious consideration of many a big company. But apparently nobody tried it out, and whatever merits his invention may have had will probably remain latent until rediscovered in the future.

▪ Food Technologists Should Set Their Sights on Top Jobs

With the election of J. Stafford Ellithorp, Jr., to the presidency of Beech-Nut Packing Co., another food technologist has achieved the top position in a food processing company.

While food technology always will be the major concern of members of the Institute of Food Technologists, it obviously is not their sole professional interest. If it were, such men as Mr. Ellithorp, James McGowan, of Campbell Soup Co., and H. N. Riley, executive vice-president of H. J. Heinz Co. never would have reached their present positions of command and leadership.

Younger food technologists and engineers should consider top jobs attainable when they have qualified themselves. They should never limit their future prospects to technical channels. Food technology or engineering is as good a springboard for top executive jobs as law, finance or accounting. It is odd, however, that some boards of directors will entrust the management of highly technical enterprises to some very nontechnical men.

Be that as it may, ample precedents have been established. And from here on, we can expect more and more food technologists to reach the top. The only limiting factor is the willingness of the man to accept heavy responsibility and carry tremendous burdens. The top executive's life is not an easy one. But it is challenging, interesting and rewarding.

▪ You Should Be Willing Witness at Standard Hearing

The procedure for establishing a food standard permits all interested parties to contribute facts and competent opinion. That is a fundamental right and proper provision under the law.

When a complete technical record has been made, the presiding officer decides tentatively what the record means. Then the Food & Drug Commissioner advises his chief, the Federal Security Administrator, as to what should be done in promulgating a standard.

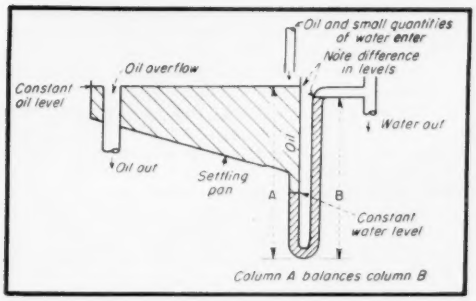
Not only do those who know the facts have a right to present them at a standard proceeding, but it is their duty to exercise this right. Then it is the duty of the executive officer to make a proper decision as to the meaning of the record and promulgate a good workable standard.

It is important that the division of responsibility in presenting and interpreting the facts be recognized. Without acceptance of responsibility at both stages—record making and interpretation—there cannot be any certainty of a good standard. And a bad standard is worse than none at all.

So no qualified man in the food industry should be reluctant to serve as a witness at a standard hearing. And he should go well armed with organized information.

While you can furnish information in the form of an affidavit, it is better to appear at the hearing in person. Unless you do, there is no opportunity to question you. So those who do not agree with you can effectively point to your absence.

PRACTICAL IDEAS



How to Separate Liquids Continuously

Two easily separable immiscible liquids can be segregated continuously by a simple device.

In the illustrative instance, the materials involved were oil and water in a settling pan. Because of failure of an operator to draw-off waste water from a settling pan, the water level often reached the oil overflow and ran into a stock kettle.

A simple continuous separating rig-up is now proving 100 percent dependable (see sketch). It is so sensitive that a thimbleful of water poured into the settling pan causes the immediate discharge of a like quantity from the waste water outlet.

In the construction of the apparatus, the bottom of the "U" (refer to sketch) should be a sufficient distance below the constant water level in section A to prevent oil from getting into section B. The top of column B (water overflow level) should be positioned below the oil level at a point which fixes the elevation of the lower water level in the A column.

This same elementary principle can be used in the design of other equipment for varying purposes, such as to remove larger quantities of either the light or heavy liquid.—*P. A. Williams, The W. & F. Manufacturing Co., Inc., Buffalo, N. Y.*

Can Cooling on Pallets

A temporary arrangement for cooling filled cans, continued at the Fisher Spiegel Co. plant in Geneva, Ohio, has proved very satisfactory, being efficient, economical of plant space, and low in labor requirements. Here is the story:

When the company started packing apple sauce in No. 10 cans in 1949, it was not set up for cooling these cans.

To solve the problem, cans were laid in a single layer on lift truck pallets, with the round sides of the cans resting in the channels between the pallet slats. Secure in this position, they are transported by the lift trucks to a concrete platform with drain. Here, in the open where evaporation is rapid, the cans are subjected to cold water sprays.—*FI Staff*

$25 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get additional pay of $25.

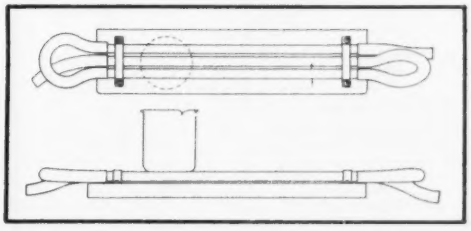
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD INDUSTRIES, 330 W. 42nd St., New York 18, N. Y.

■ ***APRIL PRACTICAL IDEA voted best was "Belt Slack Proves Advantageous." It was submitted by W. A. Reed. Plant Engineer, Taylor Reed Co., Glenbrook, Conn., and Ivan C. Miller, FI Consultant.***

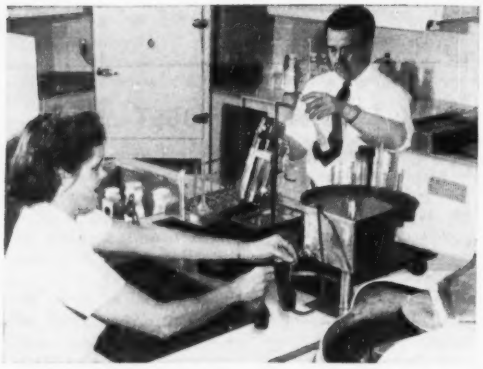


Evaporates Low-Boil Flammables

A simple apparatus for evaporating low-boiling flammable liquids, such as carbon disulphide, has been devised.

Glass tubes, $\frac{3}{8}$ in. in dia. and 15 in. long, are employed. These are mounted on a board (as shown in the accompanying sketch) and are connected by pieces of rubber tubing. Hot water is then passed through the tubes to provide the heat for the evaporation of the solvent.

It is pointed out that soft copper tubing can be used in place of the glass. Copper has an advantage, in that it can be bent easily to conform to the shape of the evaporating vessel. Thus, where a beaker is used, both the bottom and side of the container can be heated.—*Based on item by Roberto Mercade, in "Commercial Fisheries Review," U. S. Department of Interior.*

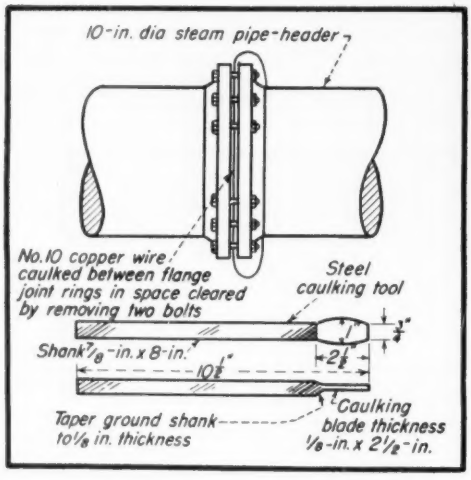


"Island" Simplifies Testing

By arranging all necessary equipment in a compact "island," butterfat testing has been simplified in the new laboratory in the Oakland, Calif., milk plant of Golden State Co., Ltd.

Here, Albert Gibson, technician in charge of quality control and designer of the new laboratory, is seen starting butterfat tests at the agitator while his assistant, Catherine Munz, removes samples from the centrifuge.

At the left is a butterfat reading lamp of unique design. A non-corrosive waste disposal unit, a special refrigeration unit, deep tempering section, and circulating fan add to the efficiency and sanitation of the butterfat testing "island".—*FI Staff*


10-in. dia steam pipe-header
No. 10 copper wire caulked between flange joint rings in space cleared by removing two bolts
Steel caulking tool
Shank 7/8-in. x 8-in.
10½"
2½"
1"
¾"
Taper ground shank to 1/8 in. thickness
Caulking blade thickness 1/8-in. x 2½-in.

Live-Steam Line Caulked With Wire

Where shutdowns would seriously interfere with operations, steam-line leaks have been caulked successfully without interrupting service. Here is how one plant operator did it:

Confronted with a leak in a 10-in. 165-psig. steam main, he was "stuck". For no substitute line was available. And with the plant running 24 hr. per day, he had good reason for concern.

First, he cut away the insulation on the main and found the flange bolts tight. Further effort at tightening failed to stop the leak. It was then he decided to try copper wire as caulking beween outer edges of the flange-joint rings.

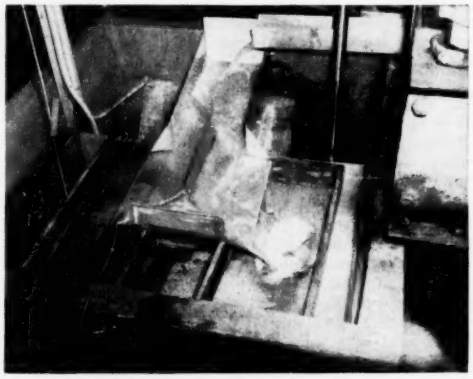
From an old cold chisel, his blacksmith fashioned a steel caulking tool (see sketch). For caulking the joint, No. 10 copper wire was chosen and cut long enough to encircle the joint rings completely. It was also decided that caulking the entire way around would do a better job and prevent any further leaks.

To provide space for caulking, two bolts at a time were removed from the 16-bolt flanges. All dirt between flanges was then blown out to assure a clean contact of the copper wire with the metal rings.

The joint ring's outer edges just touched the inside edges of the bolt holes. This necessitated placing the wire over the bolts on both sides of the work area. And to avoid wire breaking, caulking was not carried too close to the bolts on each side of the work area.

Upon completion of each sectional caulking, and before removing the next two adjacent bolts, two new bolts were inserted to replace those removed. In fact, new bolts were used all around, since it was suspected that bolt and thread relaxation had caused the original leak.

This particular caulking job has now kept the main in service over a ten year period, with no further leaks occurring. This method has been applied many times since, and it has always proved successful.—*Arthur Belton, Montreal, Canada*



Diverter Brings Constant Juice Flow

Installation of a simply fabricated device that diverts the flow of fruit juices into alternate channels has eliminated interruption of operations to remove solids from screens at the Fisher Spiegel Co. plant, Geneva, Ohio.

Juices of apples, grapes, raspberries and other fruits, flowing from the hydraulic presses carry a small amount of solids. These are separated from the juice before it is delivered to the filter press make-up tanks. The screenings (solids) that collect on the fine mesh stainless steel wire cloth must be removed periodically. This unit, seen in the accompanying photo, delivers the stream of juice to first one and then the other of two screens.

The portion of the delivery trough farthest from where the juice enters is divided by a steel sheet. At the incoming end of the partition, there is hinged another sheet of steel that functions as a gate or diversion plate to close the channel on either side. Screened juice is collected in a float valve-controlled tank, from which it is automatically pumped to the filter press tanks.—*FI Staff*

It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

- No internal wearing parts.
- No valves, pistons, or vanes.
- No internal lubrication.
- Low maintenance cost.
- Saves floor space.
- Desired delivery temperature Automatically maintained.
- Slugs of liquid entering pump will do no harm.
- 75 pounds in a single stage.

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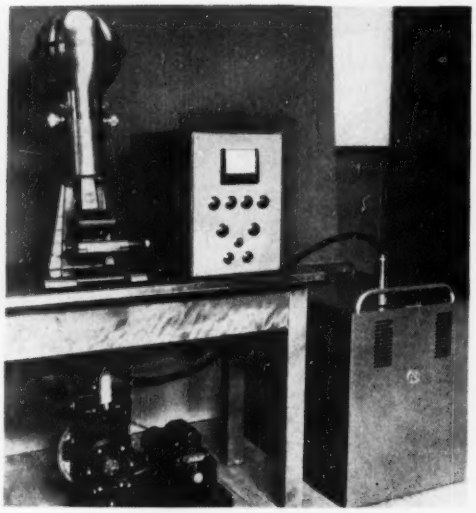
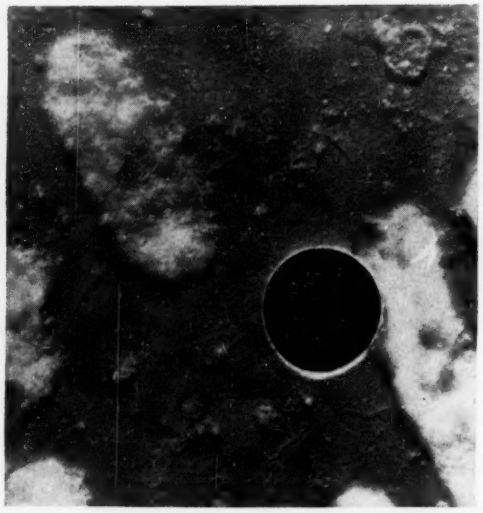
Food Equipment News



New simply operated instrument . . .

Assembly is comprised of four pieces. On table are microscope (left) and control unit. Beneath is vacuum pump. Box at right is high-voltage power supply.



. . . and a striking sample of its work

Bacterium at upper left shows signs of attack by bacteriophage. Round black hole in specimen was accidently made, but provided excellent focusing target.

Now—The Plant-Size Electron Microscope

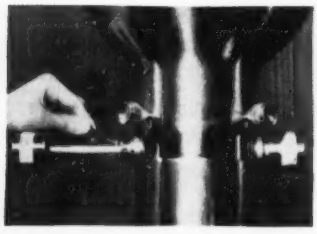
A

Minute objects and details, too small to be seen by other methods, can be observed and photographed by the permanent magnet electron microscope.

Designated Type EMP, the unit is a small but powerful instrument designed to bring the advantages of electron microscopy within reach of industrial organizations, including those in the food field. Its limit of resolution extends to 100 AU, 20 times that of the best light microscope. The new instrument gives useful information up to 50,000 diameters through photo enlarging.

To afford utmost utility, the assembly consists of four units: Microscope, control unit, hi-voltage unit, and vacuum pump. All controls for operation of the instrument are located within easy reach of the operator.

The microscope contains the electron gun adjusting screws, specimen stage controls, and camera controls. Panel of the control unit contains the "On-Off" switches, beam control (filament emission), and coarse and fine focus controls. A meter, fitted on the control unit and connected to a 5-position switch, allows the operator to read vacuum, beam current, oscillator voltage and current, and focus voltage. For accurate control of focus, the meter measures the operating voltage between 46 and 50 kv.



Putting in specimen is easy

Operator withdraws sliding rod, lifts out holder, inserts new specimen, and pushes rod back into column.

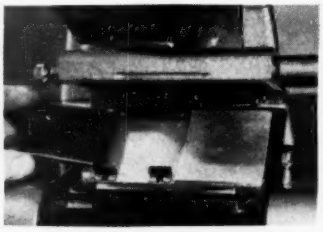
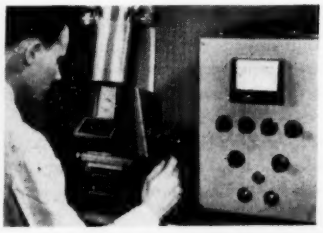


Plate is changed quickly

It takes only 90 sec. to restore required vacuum in column after operator changes plate, as shown.



And focusing is fast

Here, operator focuses beam of electrons. Unit (right) gives readings of vacuum and electrical values.

Ease, convenience, and stability of operation are featured. The specimen can be inserted in the column without breaking the vacuum. The mechanical stage movement has two controls. They provide 2-direction drift-free movement of the specimen to permit examination of approximately 36 openings of the regular 200-mesh specimen support.

The column, inclined at an angle, offers a comfortable viewing position for the operator. And the viewing port is wide, providing utmost convenience for observation and photography. It also allows more than one person to view the image at the same time.

Supported under its center of gravity, the instrument is not sensitive to normal laboratory vibrations, thus assuring image stability. Image field is of sufficient brightness for the average operator to make critical examinations without eliminating all light in the room. Uniform brightness can be held over long periods with no adjustments.

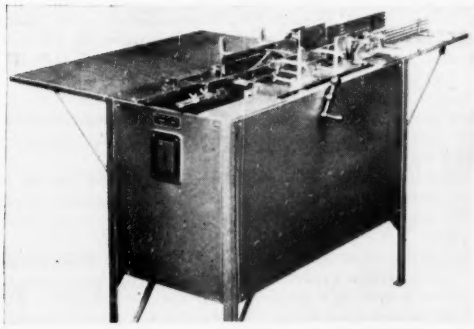
High quality performance is made possible by a new electron optical system employing permanent magnet lenses. By means of these lenses, unusual stability is permanently achieved, and accordingly the designers were able to eliminate voltage stabilizers, current regulators, power supplies, coil windings, and many controls.

Methods of mounting and introducing the specimen are simple and easily mastered. A sliding rod containing the specimen is merely pulled out of the column and then pushed in to change specimens. A new type holder facilitates pre-preparation of specimens so that production line procedures may be followed in running one specimen after another without any delay. A built-in camera may be loaded and unloaded without the necessity of completely evacuating the column, and thus the electron micrographs may be turned out at a rapid rate.

The plate, a 2 x 2 in. medium-emulsion lantern slide is loaded into a casette. The camera is opened by means of a valve that releases air into the camera chamber only. Casette is held in place by spring clips, hence can be replaced in a few seconds. Exposure is made by withdrawing the viewing screen to allow the electron beam to impinge directly on the plate. Exposure time is 1 to 3 sec.

Unit is completely interlocked and will not operate until correctly and safely assembled. It is free of X-radiation.

Three permanent magnet lenses are available for use with the EMP: 1,500X, 3,000X, and 6,000X. One is supplied with the instrument; the other two are available as accessories.—*Radio Corp. of America, Camden, N. J.*



Wrapper Is Fast on Size Changes A

This Model EZA is one of the newest additions in the wrapping machine field.

It is designed for multi-purpose use wherever a low-cost, fully adjustable semi-automatic wrapping machine is required. The new machine wraps units up to 3½ x 12 x 8 in. in size, in standard envelope-type fold, at speeds up to 20 units per min. It may be adapted for wax paper, cellophane, or heat-sealing foil wraps.

This model takes only 20 x 40 in. of floor space. Its working surface is 32 in. above the floor, with standard collapsible working table and discharge conveyor table. Maker says change-over to a different size wrap may be easily made in 5 min.

Simplified construction keeps maintenance costs at a minimum—for example, gears and chains are all standard stock sizes, obtainable at local hardware stores, avoiding costly delays encountered awaiting exclusive factory parts.—*Knapp Mfg. Co., 1101 East 12th St., Los Angeles 21.*

Want More Information?

It's free—and easy to get. Say for example, you want added details on the item marked "B" here on page 91. Just turn to one of the special Reader Service postcards inside the front cover and circle the 91B. Sign at the bottom and mail—no stamp needed. Then the extra information will be on its way to you.

Resin Is Inert to Oils, Many Acids B

An entirely different type of thermo-setting resin for use in the manufacture of an acid and alkali-proof cement or coating has been announced.

Known as Duron, it is intended to adhere without the use of a primer to concrete or metal, and is reported to be self-hardening at room temperature. Cements made with it may be employed for joining brick and tile, as a coating for concrete, steel, or wood, and as an impregnant for wood.

Maker states other useful materials may be produced by mixing it with metal powders, asbestos, cork and other insulators.

Resin is termed inert to solvents, fats, oils, grades, alkalis of all concentrations, and to a wide range of acids.—*The Electro Chemical Supply & Engineering Co., 750 Broad St., Emmaus, Pa.*

DON'T MISS THESE . . .

New delivery truck, for transporting light bulky packages, provides greater cargo capacity....Page 94

Unit indicates and records continuously viscosity of liquids while under actual processing.....Page 94

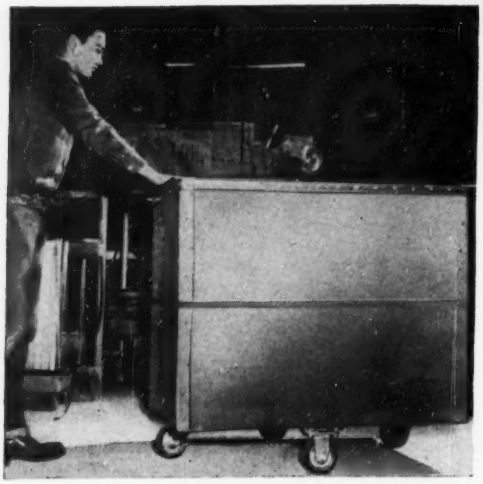
Streamlined sanitary tee features elimination of sharp corners, thus minimizes agitation.....Page 95

Dual discharge in disintegrator permits separation of waste as main product is being produced....Page 96

AND WATCH FOR . . .

Hydraulically-operated truck refrigeration system driven by vehicle's own power take-off....In July FI

Details of a new machine that automatically cartons canned beer in lots of six.....In July FI



Box-Type Truck of Aluminum A

Light weight is combined with ruggedness in this all-aluminum truck. This construction makes trucks non-magnetic, non-sparking. They require no paint, will not rust, splinter or absorb odors, can be hosed down and steam cleaned. All inside surfaces are smooth.—*Tobey Mfg. Corp., 1221 El Segundo Blvd., El Segundo, Calif.*

Units Provide Overload Protection B

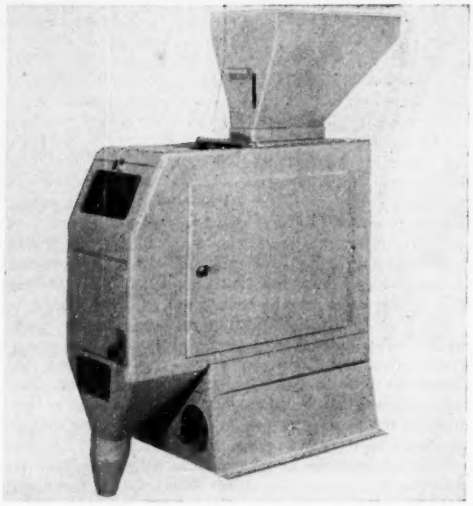
For use on conveyors, small pumps, blowers, and grinders is a new line of manually operated starters for a.c. motors up to 7½ hp.

Starters, furnished in both the toggle type (shown above) and push-button type, come in 2-, 3-, and 4-pole forms, size 0 and 1. In the above forms and sizes, the toggle types are also furnished, if desired, with cast iron enclosures for use in wet, dust-laden or hazardous locations. Renewal parts are available for all the new starters.

A feature of these starters is their bimetallic overload protectors, which replace the solder-pot relays and provide exceptionally accurate response to overloads. In addition, the starters are equipped with a wide range of heaters, all of which follow closely the motor heating curve.

Positive indication of overload trip is assured by the toggle or push-button, which assumes a neutral position when the relay trips. To prevent tampering, all starters in general-purpose enclosures can be padlocked; the toggle type can be padlocked in both the On and Off positions. All live parts are mounted on a strong, molded base of high insulating quality.

Heaters are enclosed in a cavity in the molded base, thus providing maximum protection to the operator in the event of short-circuit. Units are easy to install and operate. They are available immediately.—*General Electric Co., Schenectady, N. Y.*



Packer Handles Many Materials C

For the packager who occasionally has short runs on a variety of products, a low-priced bench model Automatic Weigher is announced. It is available on a 10-day free trial basis.

Many of the features of its predecessors, the "Elec-Tri-Pak" weighers, are reported incorporated in the new model.

The unit is a small compact machine 42 in. high. Production of this machine is limited to one standard model, but it will handle a wide range of free-flowing materials. The machine contains an overhead hopper and patented vibratory feed tray.

Material, after being placed in the overhead hopper, is gently fed across the vibrating tray into a weighing bucket. The bucket is composed of three separate sections which rotate.

As one section rotates and discharges the product through a spout after a predetermined weight is reached, a second section moves into position under the feeding tray. The machine is a pace-setter. It establishes a rate of production for the single operator, whose only job is to place a bag, carton, or any other type container under the spout.

Fraction-of-an-ounce weight changes can be made while the machine is in operation by means of a patented Acrometer weight adjustment.—*Triangle Package Machinery Co., 6633-35 W. Diversey Ave., Chicago 35.*

For beauty in WRAPPERS *...it's Patapar*

When you want a wrapper with beauty, with extra sales appeal call on Patapar Vegetable Parchment.

And with Patapar you'll have a wrapper that really protects. Patapar has high wet-strength. It resists grease. With clean, strong, white folds it will keep your product fresh and appetizing.

We'll print the Patapar wrappers for you in colorful inks with smart, modern design. Our plants are specially equipped for printing Patapar economically in one or more colors by letterpress or offset lithography.

May we show you samples of printed Patapar wrappers and quote prices on your requirements? Write us today.

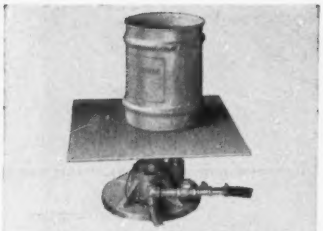
Patapar Keymark, nationally advertised symbol of wrapper protection

Wonderful for:

Butter wrappers
Ham boiler liners
Deep freeze wraps
Can liners
Fish wrappers
Cheese wrappers
Margarine wrappers
Milk and cream can gaskets
Bacon wrappers
Vegetable wraps
and many other uses

Patapar
HI-WET-STRENGTH
GREASE-RESISTING PARCHMENT

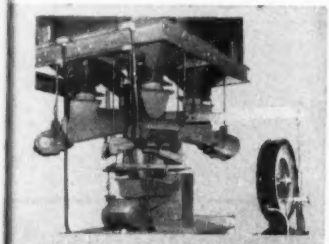
PATERSON PARCHMENT PAPER COMPANY • BRISTOL, PENNSYLVANIA
Headquarters for Vegetable Parchment since 1885
West Coast Plant: 340 Bryant Street, San Francisco 7, California
Sales Offices: 122 E. 42nd Street, New York 17, N. Y. • 111 W. Washington St., Chicago 2, Ill.



PACKERS and JOLTERS
Electric-Hydraulic-Pneumatic

LONG "Vibratory" CONVEYORS
No Motors, Gears or Other
Mechanical Wearing Parts

Reduce Costs!
Speed Up Bulk
Material Handling
with
SYNTRON



"Automatic" BATCH WEIGHING
Scale—Controlled Vibratory Feeders

"CONSTANT WEIGH" FEEDERS
Accurate, Continuous Feed
by Weight

Material Handling Equipment
With the
Long, Long Life
Write for literature
SYNTRON CO.
460 Lexington **Homer City, Pa.**

New Delivery Truck Has Added Features A

Easier operation for the driver and more efficiency for the owner are reported to be provided in a new line of multi-stop delivery trucks having Metro all-steel bodies.

The new carrier, specifically designed for transport of light, bulky packages, features a body having greater cargo-carrying capacity, with an inside height of 70 in. Side doors (at front) have been increased 4 in. in width and 1 in. in height, thus making loading and unloading easier.

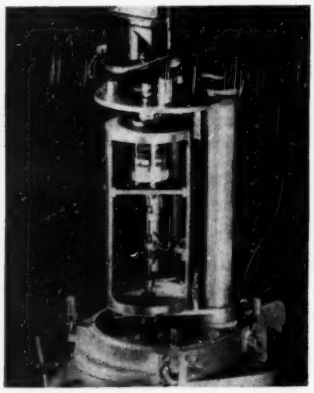
Easier servicing is provided by a new, short gas-filler spout; an outside radiator-filler housing; and handier facilities for checking oil, distributor, and carburetor.

Trucks are powered with the new Silver Diamond 220, valve-in-head, six-cylinder engine which develops 100 hp. and has a compression ratio of 6.5.

Engine features a new heavy-duty three-speed transmission and a remote-control gearshift with positive acting rods for easier, more positive shifting.

Further features include full-floating hypoid rear axles and wider-tread front axles for more stability and better steering. New shock absorbers, spring shackles, and longer springs are reported to improve riding qualities and increase service life of unit.

New line includes three body sizes: The 8¾-ft. body, with 235-cu. ft. capacity; 9½-ft. body, with 292-cu. ft. capacity; and 12-ft. body, with 375-cu. ft. capacity.—*Motor Truck Div., International Harvester Co., 180 No. Michigan Ave., Chicago 1.*



Indicates, Records Liquid Viscosity B

With a new viscometer, it is now possible to indicate and record continuously and accurately the viscosity of hundreds of industrial liquids while under actual processing.

The device, known as the Visco Mat, is reported particularly adaptable for use in the food industry where maintenance of constant viscosity is so often of major importance.

When used with an electronic recorder, this viscometer can be employed as an automatic controller with built-in audible or visual alarms.

The unit is stated to be capable of noting changes as small as 0.05 percent of scale, and it can handle viscosity from a minimum of 20 to a maximum of 100,000 centipoises.

Installation of the system is easy, steps being as follows: (1) Mounting the viscosity measuring head so that the baffle tube will be properly immersed in the fluid; (2) installing the recording instrument; and (3) connecting the two by means of a six-wire cable.

The principle of operation is simple, embodying use of a calibrated spring

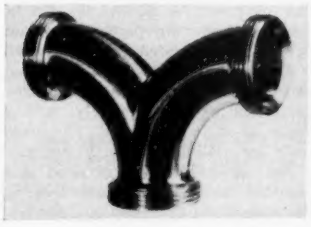
to measure the torque on a spindle rotating at a constant speed and submerged in the fluid to be measured.

Removal of the cover from the measuring-head (see photo) reveals the construction. Seen is the metal cage revolved at a constant speed by the synchronous motor mounted at the top of the assembly. It will be noted that this cage is linked to the spindle by means of a calibrated beryllium copper hairspring. A microtorque potentiometer is carried by the cage but has its movable arm also linked to the spindle.

Action of this assembly is such that, with the spindle operating in air, the hairspring is unstressed and holds the spindle arm to zero deflection—i.e., there will be no angular displacement between the spindle shaft and the longitudinal axis of the motor-driven cage.

When fluid is admitted to the baffle tube and the spindle or rotor is consequently immersed in it, the spindle will be acted on by a retarding force which bears a definite relationship to the viscosity of the fluid. Since the whole assembly is being rotated at a constant speed, this retarding force will cause a certain amount of angular displacement between the spindle and the longitudinal axis of the motor-driven cage.

The microtorque potentiometer measures accurately the magnitude of this angular displacement. It then converts this measurement into an electrical impulse which is transmitted to the recording instrument. A system of slip rings and brushes (partially visible, in photo) above top plate of motor-driven cage) continuously transmits these impulses to the electronic recorder.—*Brown Instrument Div., Minneapolis-Honeywell Regulator Co., Wayne and Roberts Aves., Philadelphia 44.*



Streamlined Sanitary Tee **A**

Available in sizes from 1 through 4-in., this new stainless steel sanitary tee fitting offers the advantages of sweep construction. Elimination of sharp corners minimizes agitation and friction.—*Tri-Clover Machine Co., Kenosha, Wis.*

The modern SALES-WINNING Bacon Wrap

ECONOMICALLY MADE BY "PACKAGE" MACHINES

Here's the new, proven way to get utmost display for your bacon and STRONG BRAND IDENTIFICATION, so important in building sales. Best of all, this attractive, eye-catching wrap is now being made quickly and at low cost by "PACKAGE" machines.

Two types of machines available

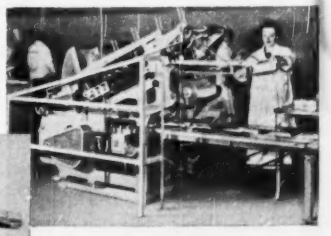
The high-speed Model FA-2 is designed especially for the larger packer. Its outstanding features appealed instantly to leading packers who witnessed its operation, and they immediately placed orders. The demand for this machine is steadily growing. The FA-2 has a speed of 60 packages per minute and uses either plain or printed cellophane, registering the printed design by electric eye. Produces crimped end-seals which are turned under and sealed to the bottom of the package, thus producing virtually an air-tight wrap. Quickly adjustable for different sizes.

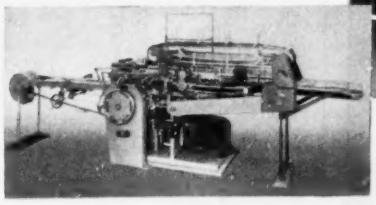
The Model F requires only one operator to feed and remove wrapped packages and is ideally suited to the smaller packer and super market. Uses plain cellophane, handles a wide variety of sizes and has a speed of up to 40 per minute.

Thermo-Print-Labeler – Either of the above machines can be equipped with our Thermo-Print-Labeler, if desired. This unit, mounted on the wrapping machine, imprints date, price, code, etc., on die-cut labels in roll form and heat-seals them to the tops of the packages.

Write our nearest office for full particulars

Model F machine wraps with plain cellophane. Speed up to 40 per min. Shown in operation in plant of Miller's Super Markets, Denver.





The high speed model FA-2 wraps with plain or printed cellophane, registering printed design by electric eye. Speed, 60 per minute.

NEW YORK CHICAGO BOSTON CLEVELAND
ATLANTA DALLAS DENVER LOS ANGELES
SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

PACKAGE MACHINERY COMPANY
SPRINGFIELD MASSACHUSETTS

MONARCH NOZZLES SOLVE YOUR SPRAY PROBLEMS

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Wax Fruits
Rinse Vegetables
Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

Remember

if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

Send for Catalogs 6 A and 6 C

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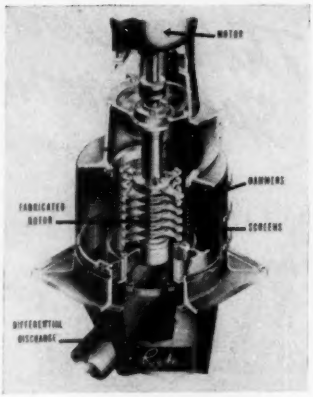
Philadelphia 34, Pa.

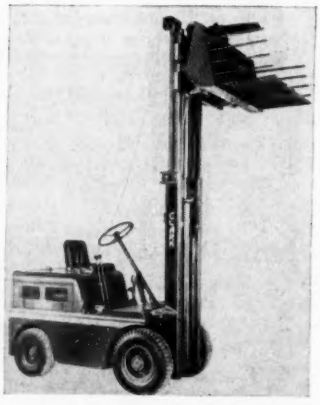


Dual Discharge Marks New Disintegrator A

Incorporation of a dual discharge is now a feature in a standard line of disintegrators for the processing industries.

The new discharge separates and eliminates waste or resistant material in many processes, concurrent with the production of the principal product. Vertical design of the disintegrator and gravity ejection of undesirable material makes this possible.

Clogging and loss of power through excessive recycling is eliminated. As a result, use of smaller power units is often possible. Maker states that processors are getting lower operating costs and higher through-put with the dual-discharge units.—*Rietz Manufacturing Co., San Francisco 5.*



Grading-Fork Attachment Speeds Bulk Handling B

For fast, safe handling of bulk materials too large to pass through a 2½-in. screen, a gravity-dump grading fork attachment has been introduced.

Applicable to models of company's fork-lift trucks of 2,000-lb. capacity and up, attachment is readily interchangeable with standard forks and attachments.

Fork has ¾-in.-dia. removable tines spaced on 1-in. centers, making it simple to change tie-spacing for handling coke, coal of larger sizes, sugar cane, vegetables, hides, stockyard litter, bones, corn cobs and similar materials. Tines enter the material more readily than a shovel, thus requiring less tractive effort.

In operation, the grading fork behaves like a gravity dump shovel. It is heavily constructed of ¼-in. steel plate mounted on a fixed plate of ¾-in. hot rolled steel. When load is raised, fork locks in position. Load is dumped when released by a 15-lb. pull.

Pneumatic snubber minimizes shock and strain of dumping.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Temperature, Humidity Quickly Checked C

Direct readings of relative humidity and temperatures in deg. F. can be taken quickly at any point in the plant by a new portable electric instrument.

The reading dial of the indicator has two scales. The upper one is calibrated in percent relative humidity, with a range of 30 to 80 percent. The lower scale has a 40-to-100 deg. F. range.

Sensing elements are mounted in a screened metal case which can be fastened to an extension rod for taking direct readings at air-supply grilles, or at any other point in an air-conditioning system. The sensing element may also be attached to the electric cord, as illustrated here.

Reading accuracies: Relative humidity 2 percent, temperature ±1 deg. F. —*Buensod-Stacey, Inc., 60 E. 42nd St., New York City 17.*

Store to store, or door to door...

NEW INTERNATIONALS

with *Metro bodies save you money!

Here are 7 reasons why the announcement of new versions of America's most popular multi-stop delivery truck is good news to your pocketbook:

1. New Metro body improvements. Wider front doors, lower floor height, more interior height—Metro body improvements throughout cut loading and unloading time and effort to a minimum.

2. New driver conveniences. New conveniences for the driver mean a better job done for the owner. These conveniences include maximum visibility, easy ventilation control, comfortable seating, and simplified driving control location.

3. New maneuverability and ease of steering. New Metro models thread more easily through traffic, turn in the shortest practical turning circles—thanks to the new steering system and wider-tread front axles.

4. New smart styling. You'll like the looks of the new Metro. New functional styling throughout adds to the unit's advertising value as well as to its usefulness.

5. New Silver Diamond Engine. This new valve-in-head power plant represents a $10,000,000 investment by International in better engine performance. It will pay off for you in new power and economy.

6. New heavy-duty engineered International chassis. Every new International multi-stop chassis is heavy-duty engineered to save you money. This means that the same values that have kept International first in heavy-duty sales for 18 straight years can now cut the cost of your delivery operation by cutting maintenance.

7. New models. Now there are 6 models ranging from 5,300 to 10,000 pounds gross vehicle weight. Metro bodies are 7¾, 9½, and 12 feet long.

Add to this all the traditional Metro advantages and, any way you figure it, you'll be money ahead to find out *more* about new Internationals with Metro bodies. See your nearest International Truck Dealer or Branch.

*Metro. Registered trade mark of The Metropolitan Body Company, Inc., subsidiary of the International Harvester Company.

International Harvester Builds
McCormick Farm Equipment and Farmall Tractors
Motor Trucks . . . Industrial Power
Refrigerators and Freezers

Tune in James Melton and "Harvest of Stars"
NBC, Sunday afternoons

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY CHICAGO

Meet the BEMIS Small Bag Family

These Bemis Bags belong on your packaging team. Here's why: They fill and pack economically. That helps your costs. They give unbeatable display to your brand. That helps your sales. They are good packages and consumers realize it. And that helps everybody.

Get the full details of the Bemis small bag story. Write or phone your Bemis man today.

A Winner for You

Bemis DELTASEAL Bags (flat-tube) have the exclusive and popular Pull-Cut-Pour Spout. The white coated or bleached paper makes your brand stand out on all sides like a million. The squared shape makes for eye-filling mass displays.

Bemis FLEXI-CARTON — In-tuck bags that square up beautifully and billboard your colorful brand all around. Like Deltaseal, these are economical bags worthy of your good product. A variety of types of closures available.

Bemis CELLOPHANE Bags are increasingly preferred for many foods, chemicals and other products. Cellophane is a showcase for your merchandise. And the brilliant color printing on Bemis Cellophane Bags shouts for attention.

Bemis WINDOW BAGS give you the advantage of Bemis' fine printing on white coated or bleached paper, *plus* the extra sales appeal of the window view of your product. These bags have the Deltaseal construction and the Pull-Cut-Pour Spout

There is a Bemis Plant or Sales Office near you —

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Los Angeles • Norfolk
Minneapolis • Mobile
New Orleans • Omaha
New York City • Peoria
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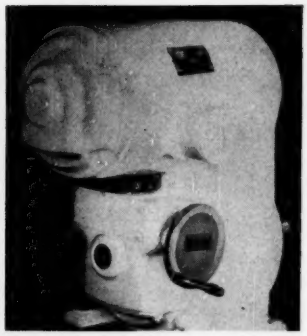
Bemis

BEMIS BRO BAG COMPANY



Keeps "Set" Speeds A

One important application for this motor is driving a pump for high temperature pasteurizing. The pump speed can be kept at a positive setting in accordance with sanitary regulations.—*Sterling Electric Motors, 5401 Anaheim-Telegraph Road, Los Angeles.*

Equipment Briefs

Perforating Coder B

High speed coding, particularly in connection with heat-sealed wax-type, cellophane or pliofilm bags, is reported with the new Model 700 photo-electric code-dating perforator. Self powered unit plugs into electric outlet. It can code up to 200 per min., depending on item size.—*American Perforator Co., 617-631 W. Jackson Blvd., Chicago 6.*

Stronger Magnetic Pulleys C

Increased magnetic power, lighter weight, and greater structural strength are reported for improved models of permanent magnetic pulleys. They are made in sizes to carry 12-, 15-, 18-, 20-, 24-, and 30-in. belt made of rubber, leather, canvas, stainless steel sheet, or any other non-magnetic material.—*Eriez Manufacturing Co., Erie, Pa.*

Flexible Conveyor Hose D

Handling of feathers, pea pods, vegetable peelings, and like materials, is purpose of a new, flexible, lightweight suction and discharge hose. It is stated to be suitable for full vacuum and any discharge pressures where the material is conveyed by a moving air stream. Hose is one-ply, wire reinforced, with a smooth bore. It is manufactured in lengths up to 15 ft. in from 6 to 14 in. i.d.—*The B. F. Goodrich Co., Akron, Ohio.*

Evaporative Condenser E

Addition of a 10-ton condenser to the 2-, 3-, 5-, and 8-ton sizes rounds out a complete line of small-tonnage evaporative condensers for the refrigeration industry. Each unit can be supplied in 1, 2, or 3 independent circuits.—*Kramer Trenton Co., Trenton, N. J.*

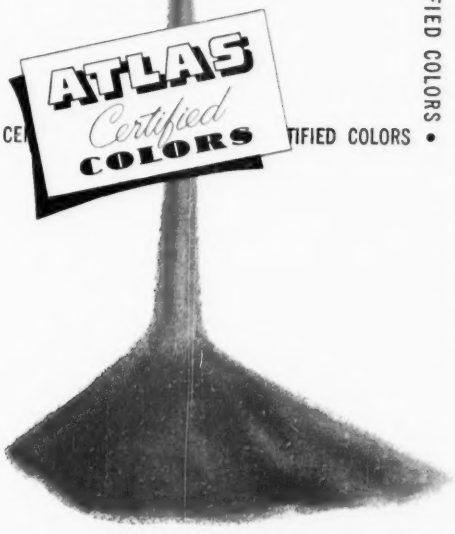
Non-Toxic Plasticizer F

Bureau of Animal Industry, Department of Agriculture, has accepted Santicizer 141 as a non-toxic plasticizer for plastic products to be used in processing or packaging of meat and meat products.—*Monsanto Chemical Co., St. Louis 4.*

—*End*

PERFECT COMBINATION

• ATLAS CERTIFIED COLORS • ATLAS CERTIFIED COLORS •



• ATLAS CERTIFIED COLORS • ATLAS CERTIFIED COLORS • ATLAS CERTIFIED COLORS • ATLAS CERTIFIED COLORS •

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Quality manufacturers who know the importance of both eye and taste appeal have been relying on H. Kohnstamm's color and flavor experts for up to 100 years. If you're not already enjoying the benefits of this time-tested combination to help sell your products, *let's get acquainted now.*

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You're as good as the Leaders...

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Yes, you're equally as good! Because the foremost producers of bottled products of all kinds use Pneumatic equipment for cleaning, filling, capping and labeling.

Why are these companies so "sold" on Pneumatic? They've been investigating and comparing different types of equipment for years — and they know the answers. They can tell you — and will — that Pneumatic's sounder engineering, more precise manufacturing and superior servicing add up to exceptionally smooth, dependable performance — and money saving "lower cost per container" operation. Your bottling will be as good as the best, when you use Pneumatic machines that are designed to meet your needs. PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Avenue, Quincy 71, Massachusetts. Branch Offices in New York, New York; Chicago, Illinois; San Francisco and Los Angeles, California; Seattle, Washington.

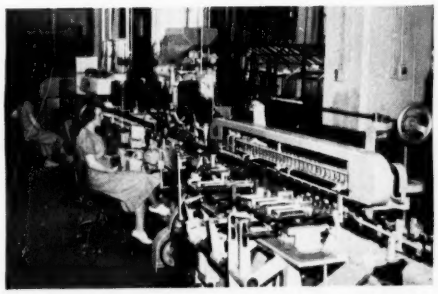

Photo above shows automatic line of Pneumatic Bottling Machines in operation at McCormick's plant in Baltimore, Maryland.

PNEUMATIC
LOWER COST PER CONTAINER

PACKAGING AND BOTTLING MACHINERY

— Now you can get a true, clear-cut picture of your actual painting costs

It's the only way to do it. Take the lid off a can of paint and see what it does for your money. No sense figuring painting costs on a price per gallon basis . . . because price per gallon means little or nothing. It's the *amount* of paint you have to buy and the *amount* of *labor* it takes to put it on that determine your painting costs . . . with paint representing 20% and labor 80% of the total.

That is why we ask you to compare by actual test . . . with the lid off and the paint in action . . . a gallon of "high price" Barreled Sunlight with a gallon of any other paint you want to use.

See, after thinning, how much more Barreled Sunlight you have ready for the brush. Notice how much more yardage *on the wall* you get with Barreled Sunlight . . . and how much brighter, cleaner and opaque it is after drying. And with your labor costs in mind, check how much less time it takes to cover the same number of square yards of wall space with Barreled Sunlight.

Such a test proves time and time again, that no matter what paint you are now using, you can save *more* money *on paint and labor . . . and come up with lower over-all painting costs* . . . by paying a few cents extra per gallon for famous Barreled Sunlight.

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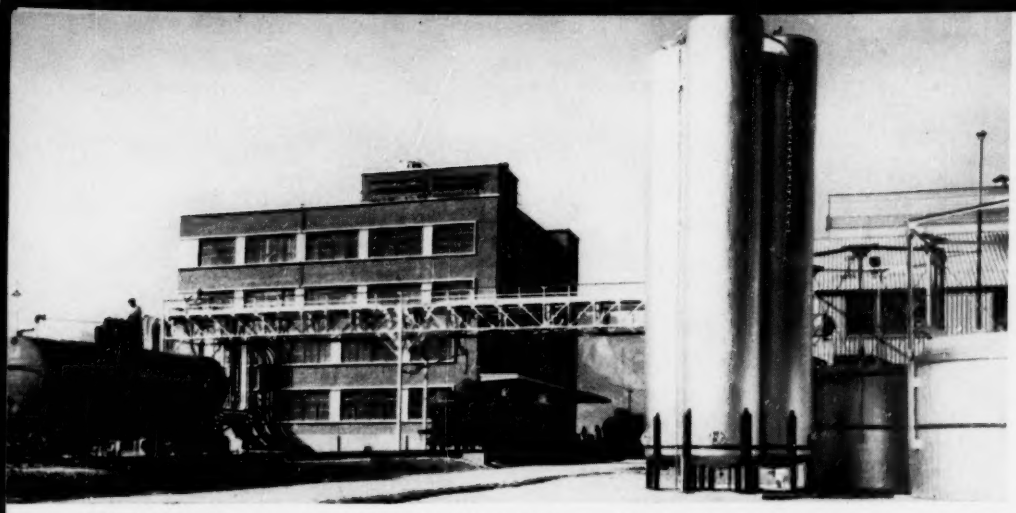
Barreled Sunlight *Paints*

In whitest white or clean, clear, pleasing colors, there's a Barreled Sunlight Paint for every job

IT ALWAYS COSTS MORE NOT TO PAINT!



1 **START** of oil refining operation in Mexico's $3,000,000 food processing plant. From building (right) comes hydrogen gas used to hydrogenate oil for margarine. Tank cars deliver raw cottonseed oil, which is pumped to storage tanks.

MAKING OLEOMARGARINE

Oil Is Refined, Then Mixed With Pasteurized Milk and Other Ingredients

MARGARINE is turned out at the rate of 2,500 packages an hr. at the new modern four-story plant of Anderson, Clayton & Co., Monterrey, Mexico. The company's complete operation—from refining oil to manufacturing margarine—is depicted in the accompanying foldout flowsheet (right).

Tank-car loads of raw cottonseed oil are delivered to the plant, where the oil is stored in huge vats each holding 4,200,000 liters (about 1,109,556 gal.). From these storage tanks, the oil is pumped to scale tanks on the fourth floor of the processing plant.

Here, the oil is either weighed or measured volumetrically before it is refined. There are five steps to the oil refining process: (A) Fatty acids are removed, (B) the oil is purified by washing it several times, (C) moisture is next driven off by drying the oil, (D) then the oil is bleached and deodorized, and (E) finally the oil is "winterized"—cold treated to crystallize the stearines that are removed by filtration.

Hydrogenation of the carefully refined oil is the next step. At this stage, a catalyst is employed to accelerate hydrogenation—the addition of hydrogen atoms to the oil molecules. This process provides the product with suitable plasticity and a high degree of stability.

After the oil has been hydrogenated it is filtered and held in storage tanks on the third floor until it is needed on the floors below. Some of these tanks have a capacity of 35,000 kilos (about 77,000 lb.), and they extend from one floor of the plant through to the next one. Before going into the margarine, the hydrogenated oil is deodorized—Point (4)—in huge vats on the second floor.

Meanwhile, the cultured, pasteurized milk is prepared. In this process, a lactic acid culture is added to pasteurized skim milk at 70 deg. F. After a 10 to 14-hr. incubation or ripening period, the cultured milk is cooled. Salt, benzoate of soda and lecithin are added with vigorous agitation. Hydrogenated cottonseed oil and vitamins A and D are mixed and added to the skim milk. Each kilogram (2.2 lb.) is enriched with 20,000 units of vitamin A and 2,000 units of vitamin D.

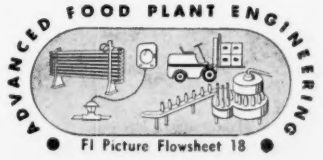
After sufficient agitation, the emulsion of skim milk and hydrogenated oil is pumped through an ammonia-refrigerated Votator. Here, the mix is instantly chilled as small quantities pass over a relatively large heat-transfer surface.

Finally, the chilled margarine is pumped to the packaging department. Here, on the automatic filling and packing line—Point (7)—the margarine is injected into cartons, which are then closed. The cartons are then delivered to the tempering room, where the product is allowed to harden to the shape of the package.

Not all of the refined or hydrogenated oil is used in the manufacture of margarine. Some of the refined oil is mixed with vinegar, spices and eggs to make mayonnaise. Or, it is bottled as cooking and salad oils at the rate of 2,400 bottles an hour. Hydrogenated cottonseed oil, on the other hand, is plasticized with stearine flakes to produce a shortening.

For additional information on this modern facility, the reader is referred to the article, "Mexico Now Boasts 'Ultra' Food Plant," page 77, April FI.

FOOD INDUSTRIES June 1950 Pages 102-105



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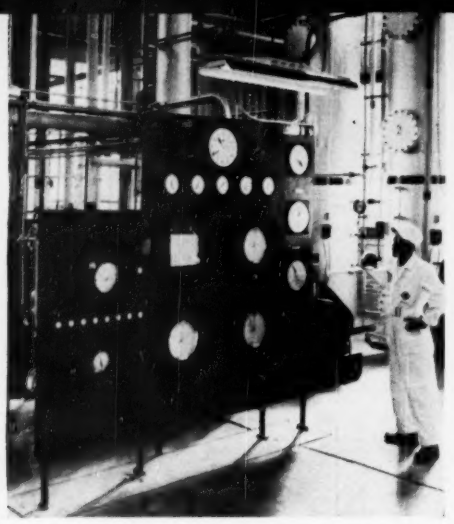

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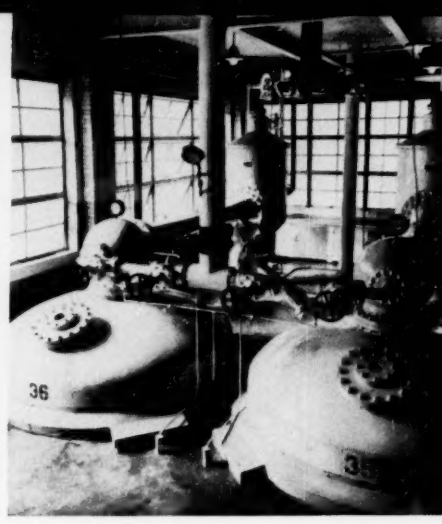

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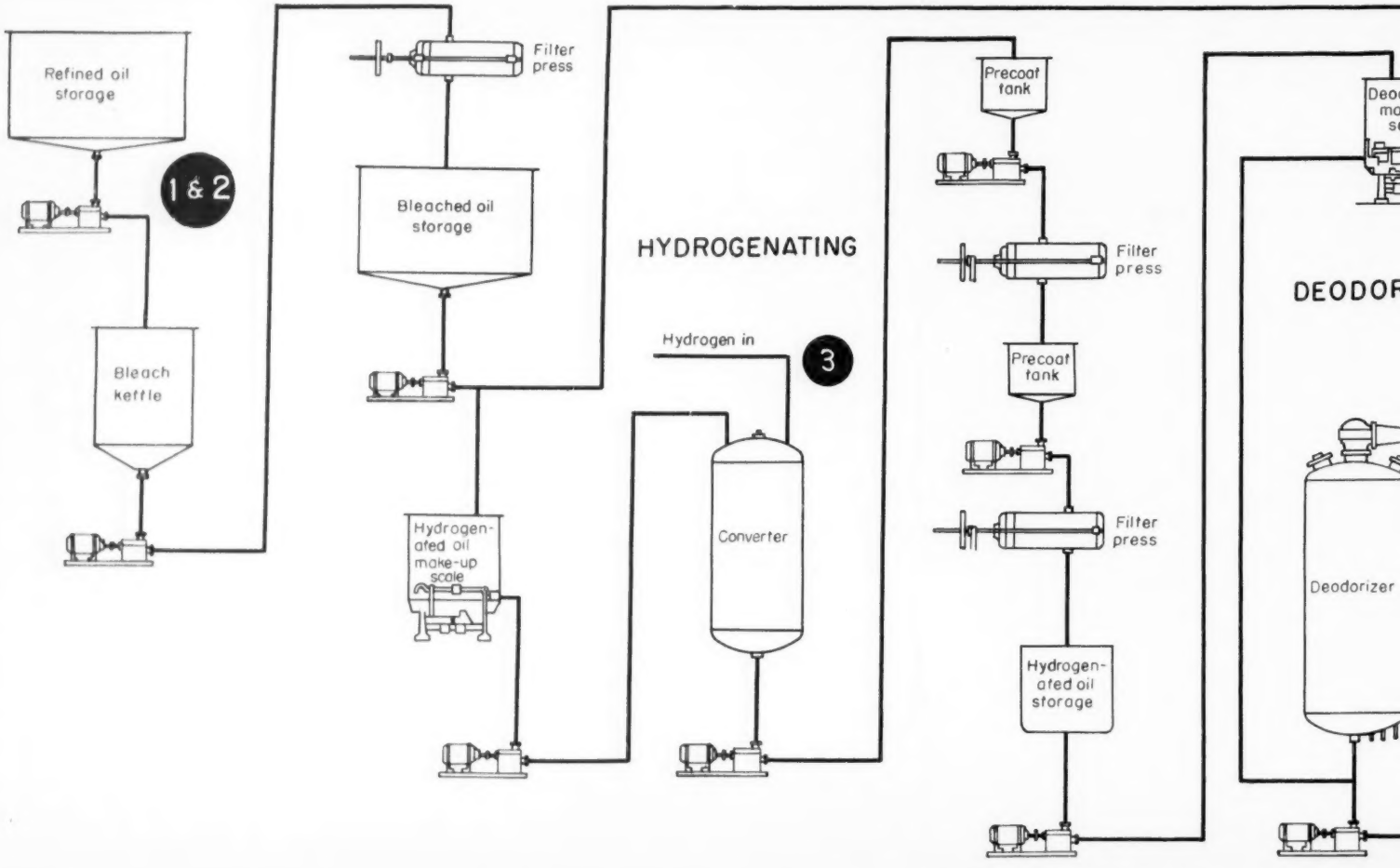
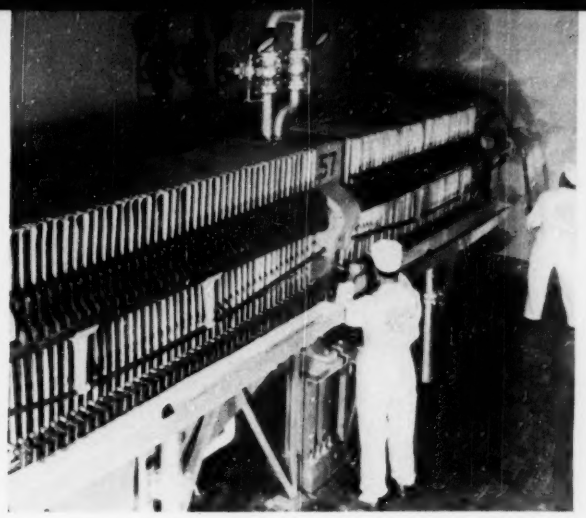


vacuum oil.



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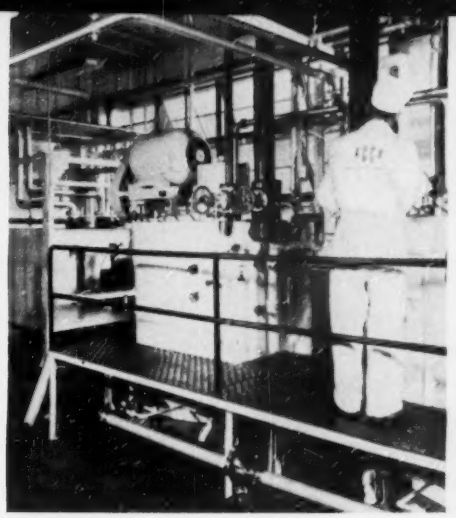

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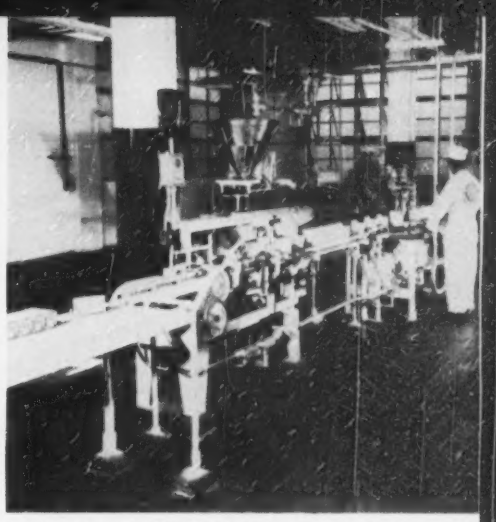

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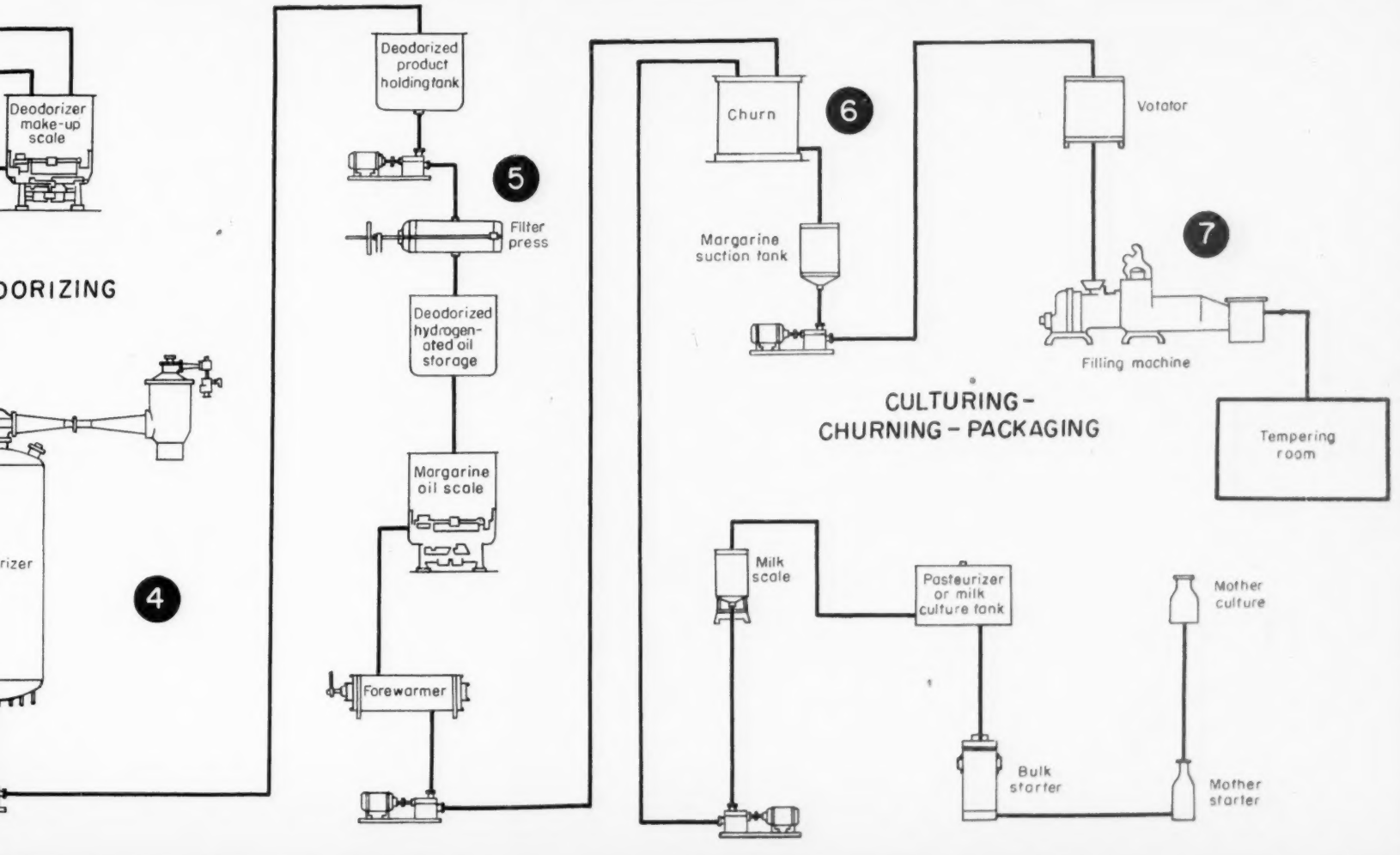

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—keeps frozen food packaging in TUNE!

Sylvania Cellophane MSB-2 in the 450 gauge is the overwrap on this frozen shrimp package.

Special properties tailored to your specific requirements tell why:

1 Low cost
2 Low temperature durability
3 Excellent printing surface
4 Sales appeal
5 Easy application

Mr. Cellophane is always available to help you solve your packaging problems. Talk over your requirements with your Sylvania representative or write us mentioning the specific application in which you are interested. Address Market Development, Dept. F-6.

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For food processors handling fluids non-co
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much to offer. Their well-proportioned bodi
constructed to withstand severe service condi
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These valves require only minimum mai
threads, outside the valve body, are easy to
not subject to erosion and corrosive effect
Packing life is lengthened by Crane ball-type
flange which maintain uniform pressure on
with brass trim or all-iron, or with compositio
or flanged ends available. See your No. 49

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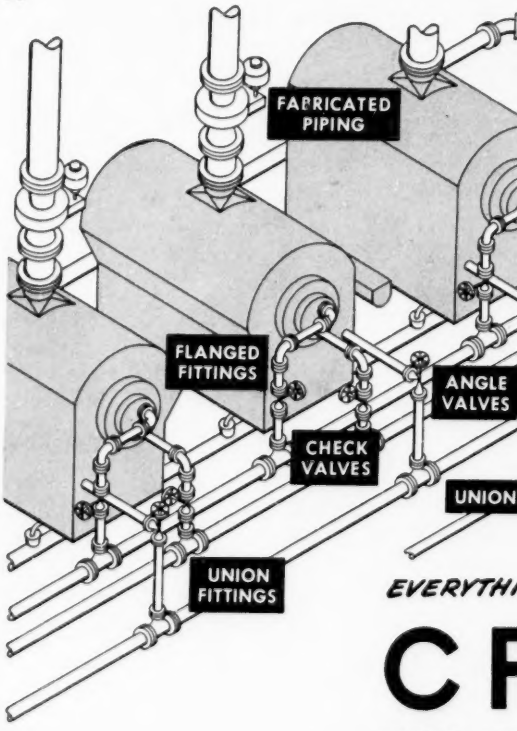
ONE ORDER TO CRANE SUPPLIES
FOR THIS DRUM FILTER BATTERY, FOR E



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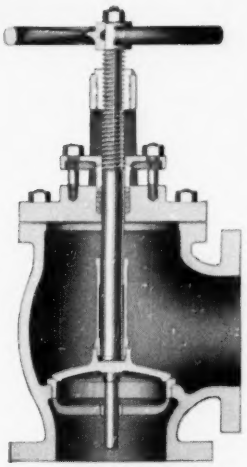
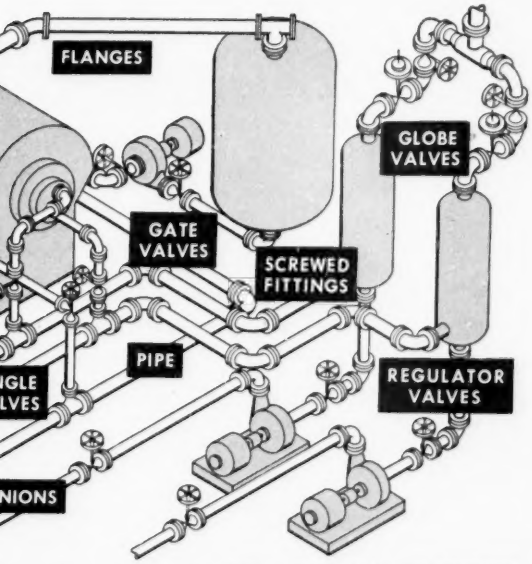


No. 353, Flanged Angle Valve. Working Pressures: 125 pounds steam; 200 pounds water, oil, or gas. Sizes: 2 to 10-inch.



THING FOR EVERY PIPING SYSTEM

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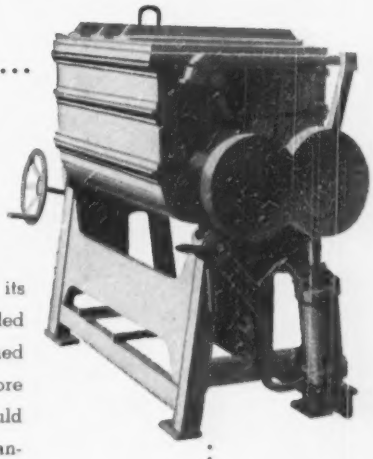
FITTINGS • PIPE • PLUMBING AND HEATING

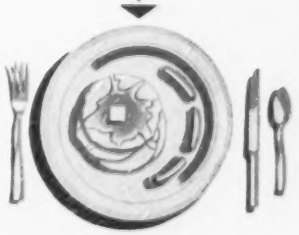
How to Mix Purer, Finer-flavored Sausage Meat For Quick-cure Processing and Increased Sales



For improved flavor and other high-quality characteristics in its quick-cured sausages, Robbins Packing Company recently installed a new-type vacuum mixer. This 1000-lb. capacity unit is designed with stainless-clad steel bowl and with special blades for more thorough agitation and better removal of air pockets, which could induce bacterial growth and spoilage. Product is protected, cleaning made easier and faster, purine corrosion resisted. The mixer, quickly paid for out of savings from faster batching, inhibited spoilage and reduced shrinkage. Increased sales of an improved, high-quality product are the result.

Your processes, too, can surely be improved by newly developed, more efficient equipment. Better quality, increased production, economical maintenance, reduced operating costs, longer equipment life are advantages that can't help but produce a more profitable and saleable product.

Behind all such advances is the cooperative ingenuity of engineer, designer, fabricator, materials supplier. This teamwork we call *Lukenomics*. There's a Lukenomics team eager to take on your equipment problems. Tell us about them. Write our Manager of Marketing Service, Lukens Steel Company, 401 Lukens Building, Coatesville, Pa.



The vacuum mixer described is built by the Allbright-Nell Company, of Type 304 Lukens Stainless-Clad Steel to provide with maximum economy, an easy-to-clean smooth surface with the required resistance against purine corrosion.

LUKENS

LUKENS STEEL COMPANY

BETTER PRODUCTS FOR BETTER EQUIPMENT

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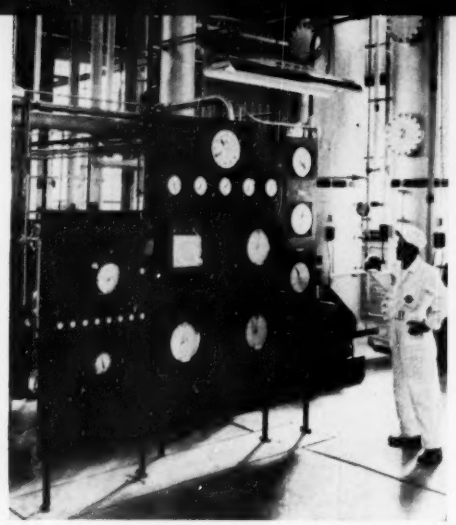

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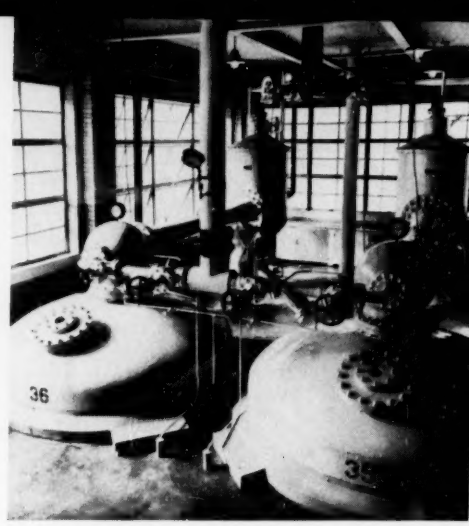

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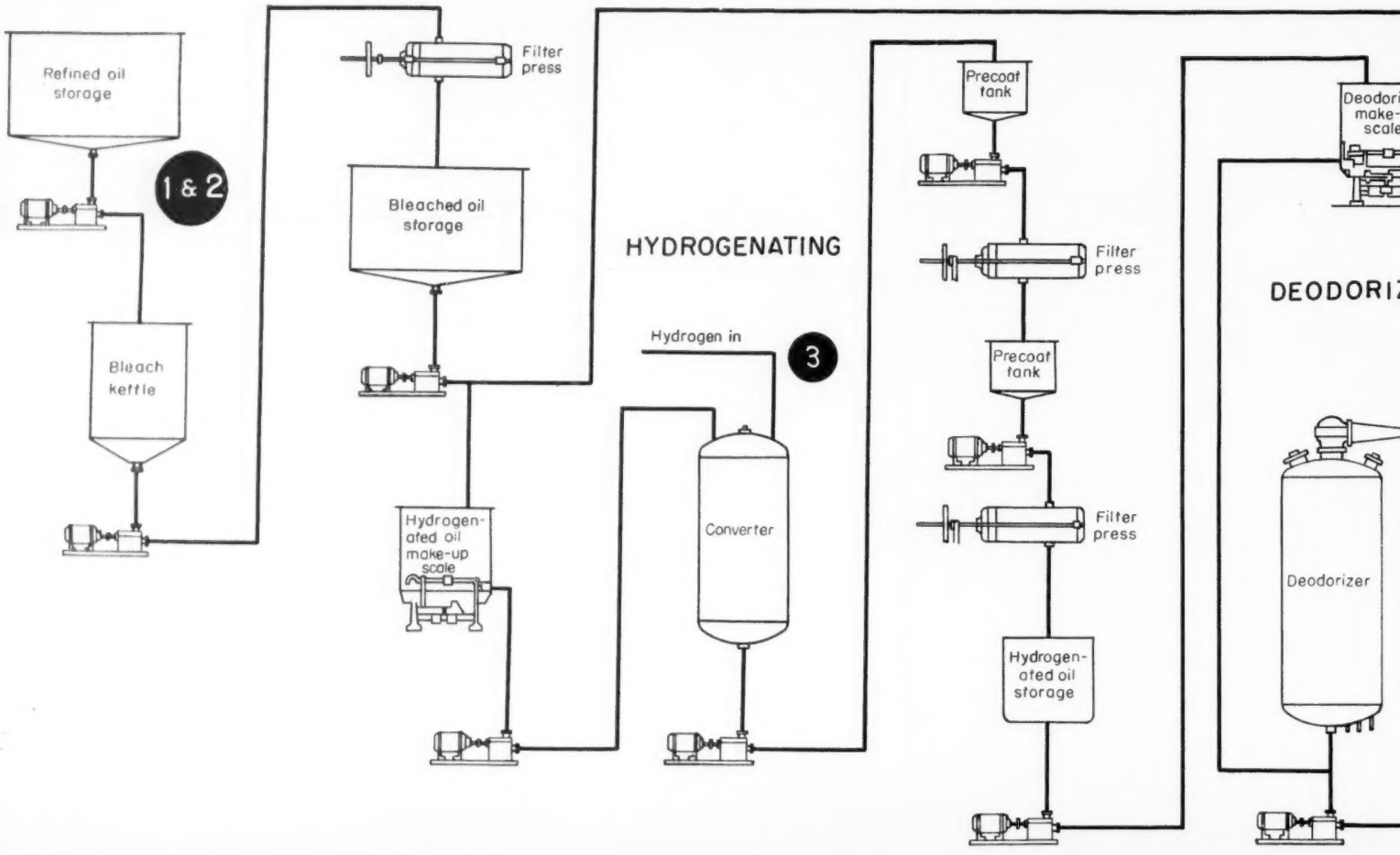

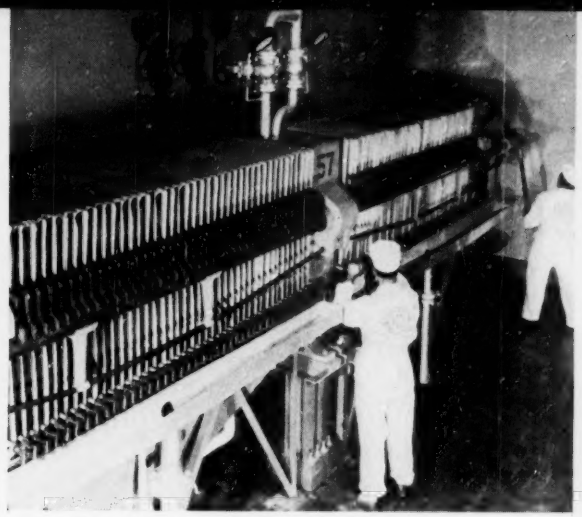

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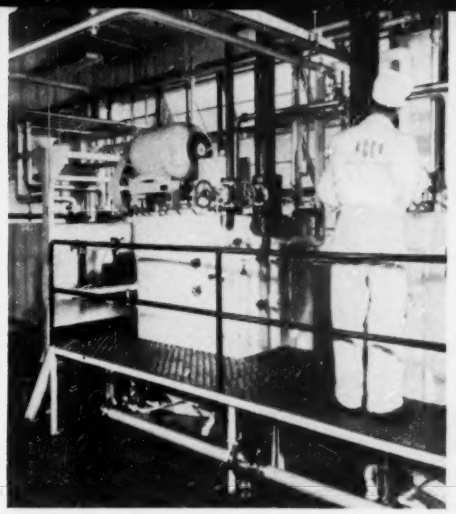

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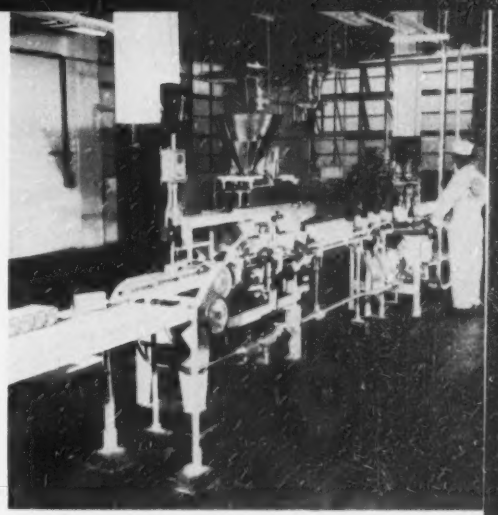

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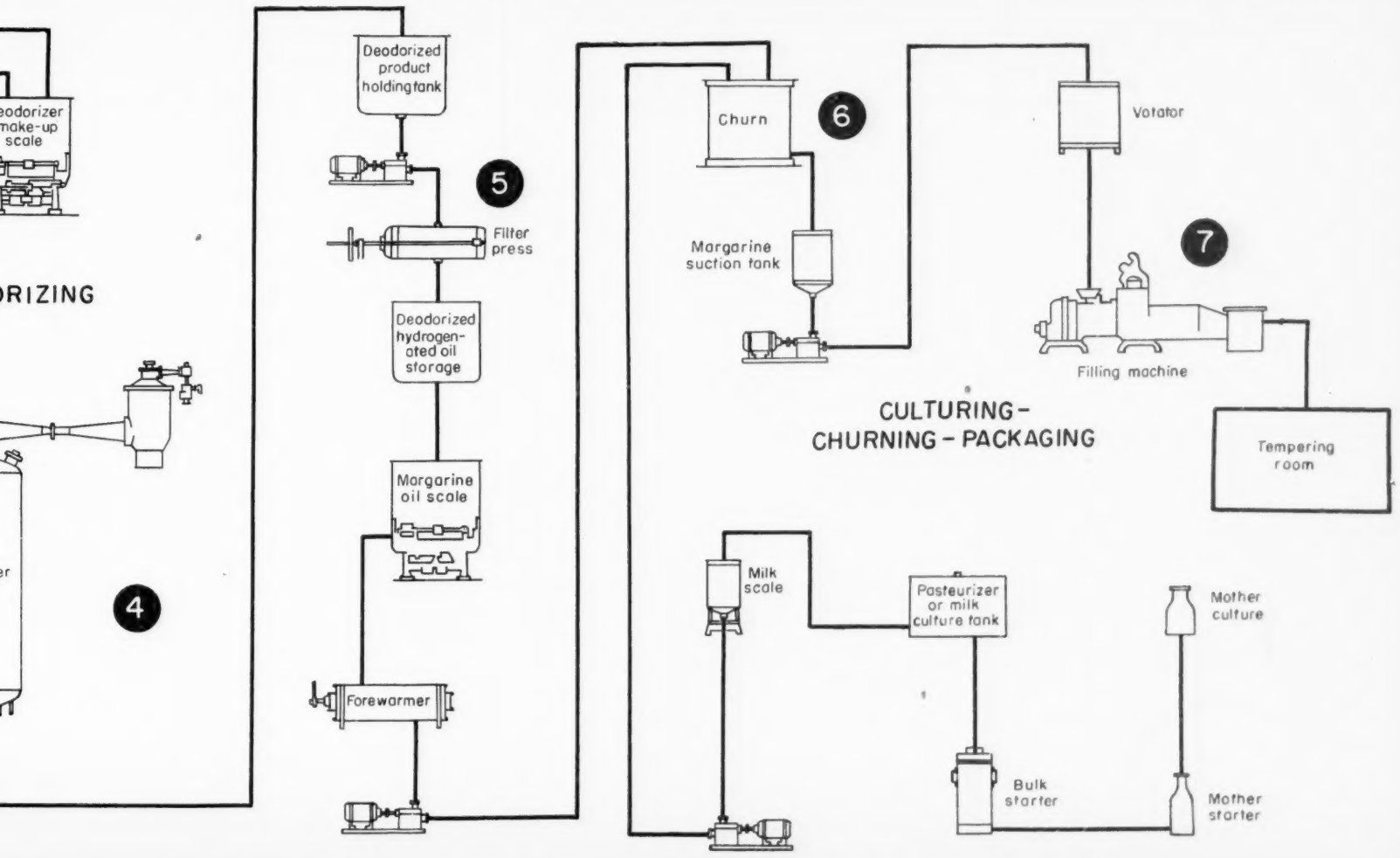

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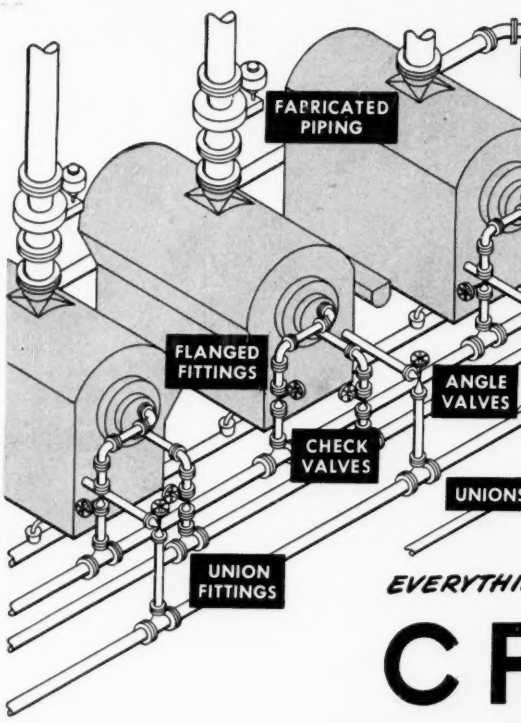

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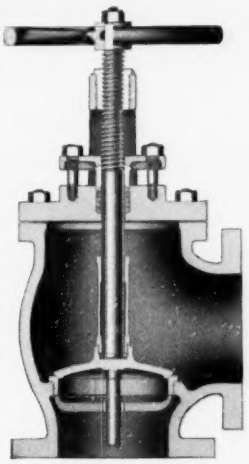

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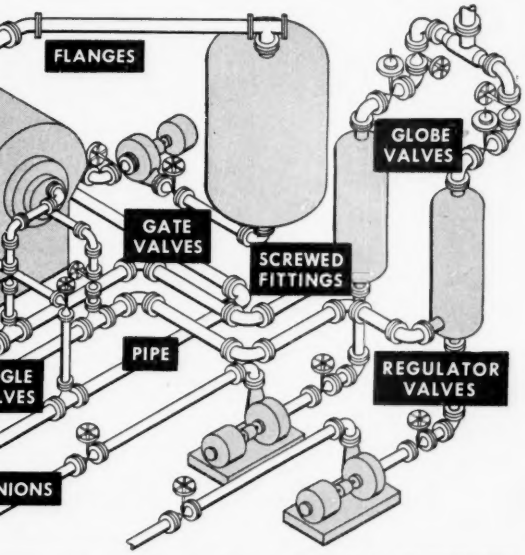

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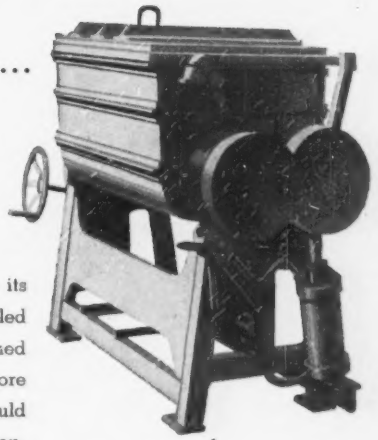
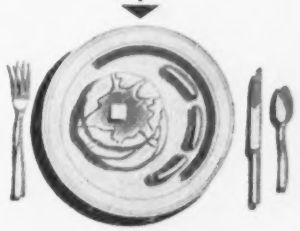
How to Mix Purer, Finer-flavored Sausage Meat For Quick-cure Processing and Increased Sales



For improved flavor and other high-quality characteristics in its quick-cured sausages, Robbins Packing Company recently installed a new-type vacuum mixer. This 1000-lb. capacity unit is designed with stainless-clad steel bowl and with special blades for more thorough agitation and better removal of air pockets, which could induce bacterial growth and spoilage. Product is protected, cleaning made easier and faster, purine corrosion resisted. The mixer, quickly paid for out of savings from faster batching, inhibited spoilage and reduced shrinkage. Increased sales of an improved, high-quality product are the result.

Your processes, too, can surely be improved by newly developed, more efficient equipment. Better quality, increased production, economical maintenance, reduced operating costs, longer equipment life are advantages that can't help but produce a more profitable and saleable product.

Behind all such advances is the cooperative ingenuity of engineer, designer, fabricator, materials supplier. This teamwork we call *Lukenomics.* There's a Lukenomics team eager to take on your equipment problems. Tell us about them. Write our Manager of Marketing Service, Lukens Steel Company, 401 Lukens Building, Coatesville, Pa.



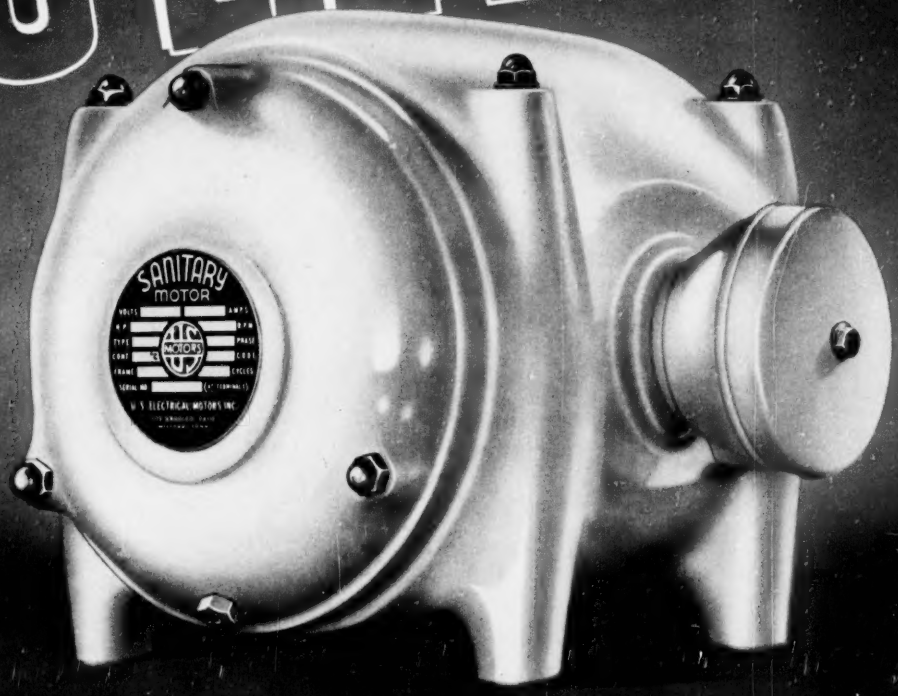
The vacuum mixer described is built by the Allbright-Nell Company, of Type 304 Lukens Stainless-Clad Steel to provide with maximum economy, an easy-to-clean smooth surface with the required resistance against purine corrosion.

LUKENS

LUKENS STEEL COMPANY

BETTER PRODUCTS FOR BETTER EQUIPMENT

CLEAN

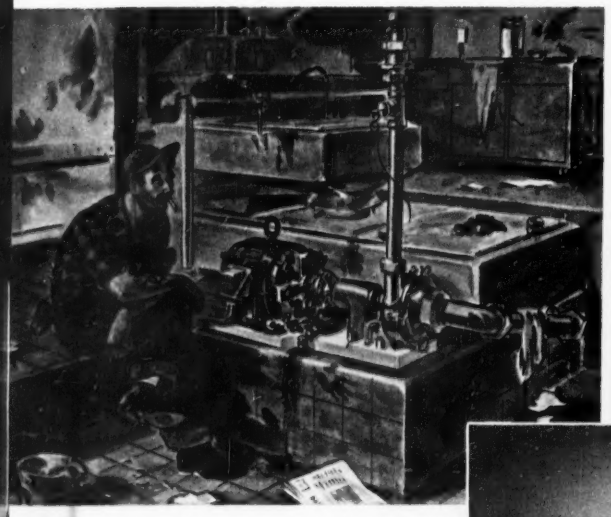


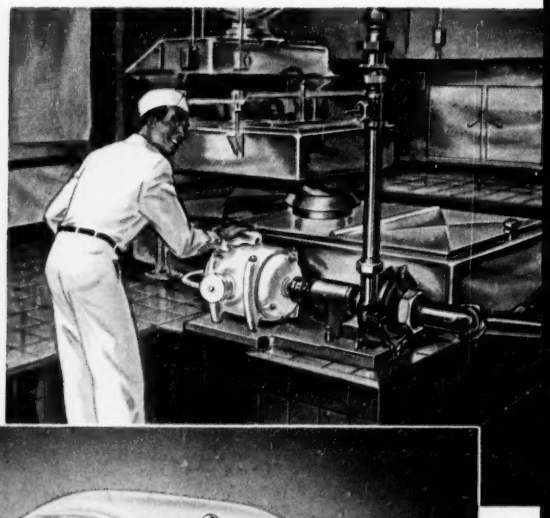
U.S. Sanitary MOTOR

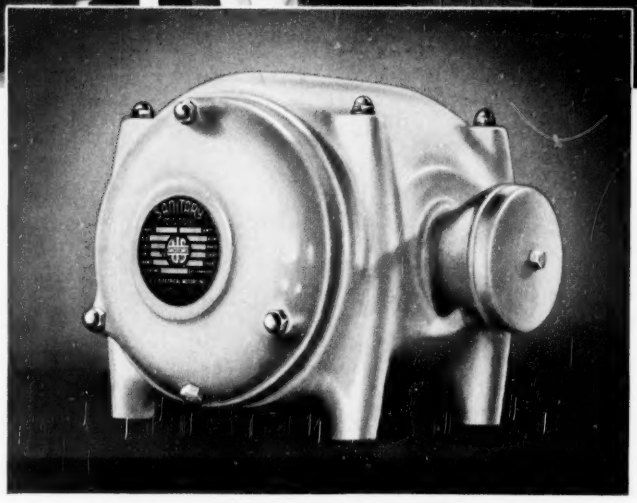
(See next page)

What a world of difference this magnificent motor makes!

Encourages cleanliness — Inspires workers — Enhances machine appearance







The spic-and-span motor that creates plant pride

● You invest thousands of dollars in fine machinery to modernize your plant for increasing production. You take pride in showing customers your facilities. Why mar the appearance of your fine equipment and plant by using unkempt, filth-collecting motors? For only a few dollars more you can now install this new immaculate *U. S. Sanitary Motor*. It's completely housed; it's finished in glistening white baked enamel—just like the most costly refrigerators; it's strikingly handsome. This specially designed motor will inspire your workers to keep equipment spic-and-span. With the swish of a cloth the motor can be wiped clean—and you can hose it down without moisture reaching the windings. *Ask for Bulletin No. 1554.*

Exclusive Features, as new as tomorrow

- **Smoothly contoured**
- **No crevices or grooves**
- **Corrosion-resistant**
- **Sealed terminal leads**
- **Baked white enamel**
- **Universal mounting**
- **Rotary water seal**
- **Machined flush joints**
- **Stainless name plate**
- **½ to 7½ horsepower**

U. S. Sanitary MOTOR

PACIFIC PLANT: Los Angeles 54, California **ATLANTIC PLANT: Milford, Connecticut**

Atlanta 3, Ga.; Bakersfield, Calif.; Boston 16, Mass.; Chicago 8, Ill.; Cincinnati 16, Ohio; Cleveland 14, Ohio; Dallas 9, Texas; Detroit 2, Mich.; Fresno 1, Calif.; Houston 4, Texas; Indianapolis 4, Ind.; Milwaukee 2, Wisc.; Minneapolis 2, Minn.; New York City 6, N. Y.; Philadelphia 2, Pa.; Pittsburgh 2, Pa.; San Francisco 7, Calif.; Seattle 4, Wash. » » » » *Distributors and Agents in all principal cities.*

NOW—Simpler, Faster, Automatic Titrations!

The BECKMAN Automatic TITRATOR

Here's another new Beckman advancement in instrumentation—*an instrument that runs your titrations for you.* It's the Beckman Automatic Titrator—the instrument that makes accurate titrations more rapidly and conveniently than by manual methods.

SIMPLE OPERATION: In a series of titrations, simply fill the burette, place the sample in the beaker—and the Beckman Automatic Titrator takes over from there. Raising the beaker holder into position automatically starts the stirrer motor and begins delivering titrating solution into the sample.

A special circuit electrically anticipates the approaching end point, scaling down delivery of the titrating solution in progressively smaller increments to assure a highly accurate titration. When the end point is reached, delivery of the titrating solution stops and a light shows completion of the titration—*all automatically and without attention from the operator.*

Whether your laboratory is large or small the Beckman Automatic Titrator provides important advantages in your titrating operations . . .

- *It releases the technician during titration, enabling him to perform other operations such as preparing samples, or calculating results.*
- *It eliminates the fatigue caused by close observation required in manual procedures.*
- *It gives objective, reproducible results . . . eliminates errors due to personal factors.*
- *It provides time-saving conveniences for sample handling.*

PERFORMS A WIDE VARIETY OF TITRATIONS—Neutralization, Oxidation-Reduction, Precipitation, Complex-Formation and other types.

NO SPECIAL TRAINING IS REQUIRED—rapid and accurate titrations can readily be performed without special skill or technique.

QUICK, SIMPLE OPERATION—completes many routine titrations in only 1-1½ minutes—even titrations to 0.1% accuracy in 2½ minutes or less. Change of sample is simple, rapid—a single motion raises, locates and secures new sample in operating position.

CONVENIENT, VERSATILE, ADAPTABLE—0° to 100° C temperature compensation . . . adjustable holder accommodates 10 ml to 400 ml beakers or similar vessels . . . instrument may be used with all standard burettes down to 5 ml . . . as many as four delivery units accommodated by single amplifier control unit . . . . uses standard Beckman electrodes . . . electrode holders and delivery tip can be pivoted into any required position . . . ample provision for mounting heating devices or other special equipment.

ALSO A RELIABLE pH METER—the Beckman Automatic Titrator can also be used as an AC-powered pH meter to give accurate readings over the range 0 to 14 pH, as well as millivolt readings from −600 to +1400 mv.

For full details on this new Beckman instrument see your authorized Beckman dealer—or write direct. *Beckman Instruments, National Technical Laboratories, South Pasadena 18, California.*

Factory Service Branches:
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BECKMAN INSTRUMENTS
control modern industries

Beckman Instruments include: pH Meters and Electrodes — Spectrophotometers — Radioactivity Meters — Special Instruments

New Packages and Products

Simply hand-packaged and . . .

. . . ready for the customers

Prepackage Fresh Produce in Plastic Film Bags A

Fresh produce is being bought in bulk and prepackaged in polyethylene film bags directly in the various supermarkets of Del-Farm Markets, Chicago.

The company buys its fruits and vegetables in large lots and trucks them to the 14 individual stores. Produce is then hand-packaged in tough, clear 'Visqueen' plastic film bags. Clerks tie tops with string. No labels are used.

According to company executives, buying in bulk permits more rigid product control, while still providing the attendant advantages of prepackaging. The bags may be re-used in various ways by the housewife.

Approximately one-third of all the company's produce is packaged with this polyethylene film.

The transparent film, made by Visking Corp., is formed into bags by the Flexible Package Co., Chicago.

Foil Overwrap Protects Cookies B

A laminated foil-wax-tissue overwrap heralds the entrance of Southern Biscuit Co., Richmond, Va., into the popular priced cookie market. Its luxury-type FFV cookie is now being mass-marketed in a simple folding carton, lined with corrugated parchment, and overwrapped with the new aluminum foil lamination.

Three lines—lemon thins, orange thins, and chocolate-pecan cookies—are being sold in 10-oz. cartons.

Big advantage reported for the foil wrap, made by Reynolds Metals Co., is its "extra-freshness" protection. Freshness was the company's specific objective in planning the new package and is the main talking point in sales promotion.

The carton is made of sturdy white machine-coated paperboard while the cushioning liner is of vegetable parchment. In making the overwrap, a special wax laminates the metal foil and paper tissue. Outside surface is multicolored, and printed overall.

Each package pictures the cookie inside in natural color against a bright background. Designs on all sides of the packages are identical.

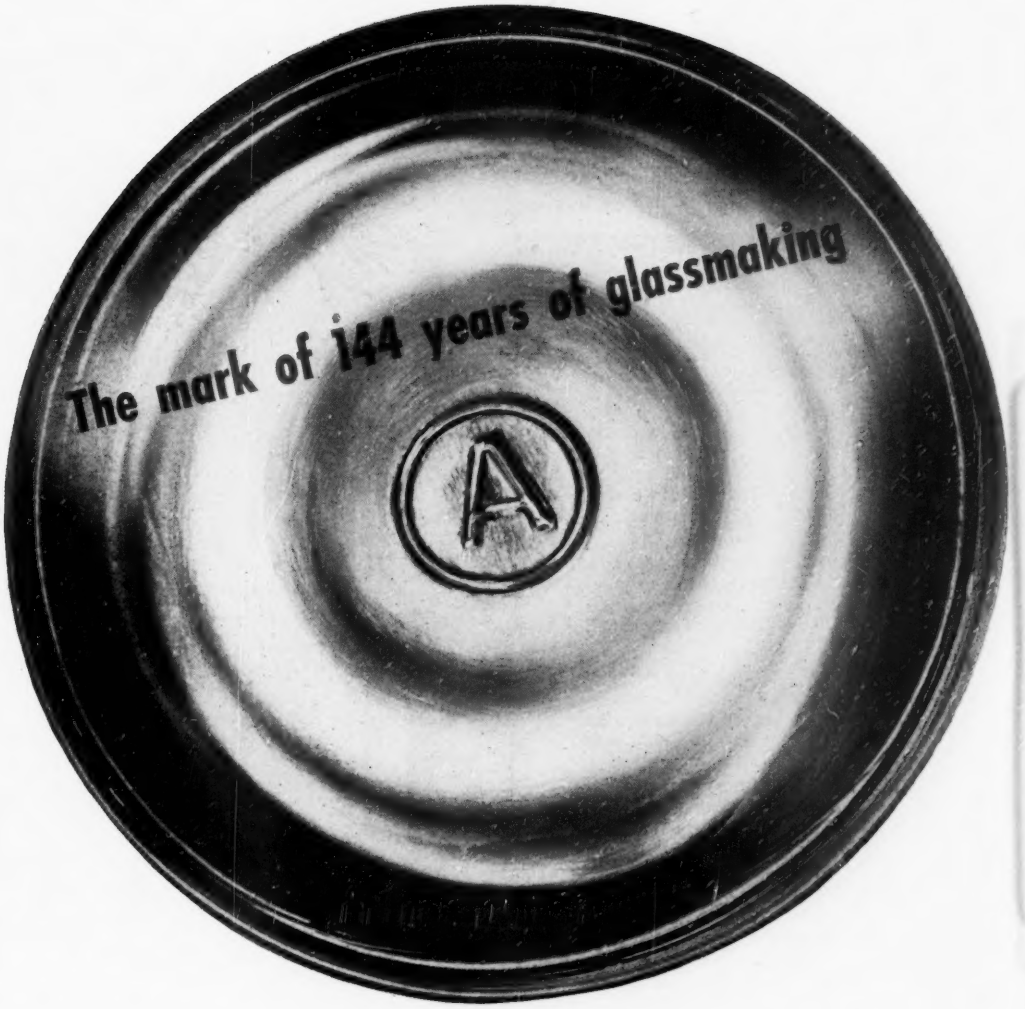
Meats in Flexible Vacuum Package C

A new flexible vacuum package is currently being used for seven varieties of luncheon meats. Grand Taste Packing Co. of Los Angeles, subsidiary of Rancho-Granada Corp., employs a newly designed heat sealing machine that can vacuum pack 30 ½-lb. flexible packages per minute. All seven meats are under the Grand Taste label.

In addition to developing the vacuum packing machine, Granada has outfitted a complete high-speed luncheon meat production line.

Want More Information?

It's free—and easy to get. Say, for instance, you want added details on the item marked "B" here on page 112. Simply flip to one of the special Reader Service postcards inside the front cover and circle 112B. Sign at the bottom and mail—no stamp needed. Then the extra information will be on its way to you.



Ordinarily, longevity doesn't mean much, but Armstrong glassmakers take a good deal of pride in the fact that glass has been made continuously at the Millville Plant for 144 years and at the Dunkirk Plant for 71 years. The skills, experience, and traditions of fine craftsmanship that have been passed down through the generations from father to son have much to do with the fine quality of Armstrong's Glass Containers. Ask your Armstrong representative for details on any of Armstrong's glass or closures or write to Armstrong Cork Company, Glass and Closure Division, 4206 Prince Street, Lancaster, Pennsylvania.

ARMSTRONG'S GLASS

NEW
JAMISON "50" DOOR

COOLER AND FREEZER

FOR THE FIRST TIME ALL THESE FEATURES OFFERED IN A STANDARD DOOR

MONOPANEL CONSTRUCTION 1
Heavy plastic bonded plywood front and back gives three to four times greater strength and rigidity than conventional doors . . . freedom from warping and a better seal. The unbroken flush surface is attractive, sanitary and easy to clean. There is no place for dirt and bacteria to lodge.

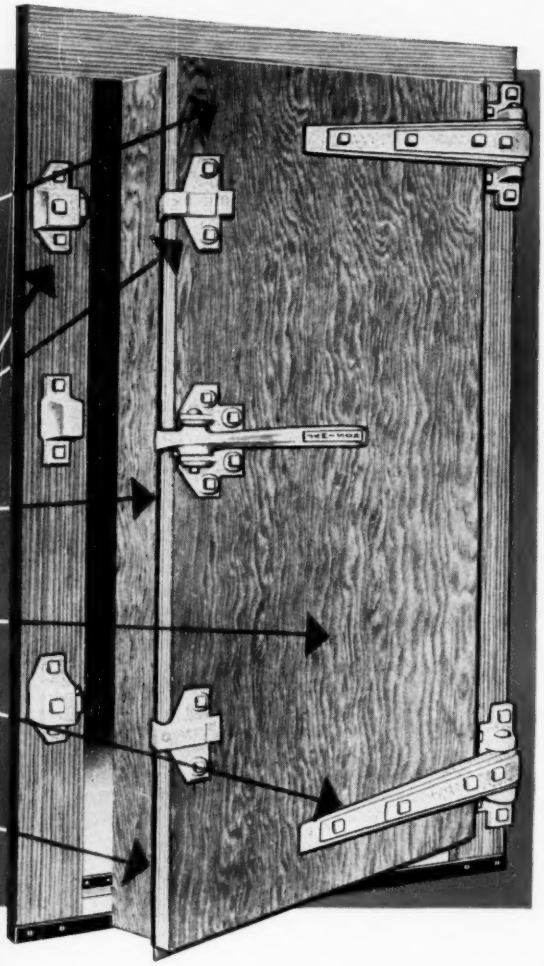
E-Z OPEN TWO-POINT FASTENERS 2
These patented fasteners exert even pressure at top and bottom equal to hinge pressure. Result—a positive seal at all points.

LO-TEMP GASKET 3
The kind usually found only in sub-zero use . . . creates a plug seal between side of door and edge of casing for extra protection.

UNBROKEN INSULATION 4
Rigid construction eliminates internal bracing. *All* of the inside space is filled with effective unbroken insulation.

ADJUSTOFLEX HINGES 5
Patented hinge design in which spring tension regulation and automatic self-adjustment are combined. Assures tight seating of the Lo-Temp gasket.

EFFECTIVE VAPOR BARRIER 6
Flooding of inside face of Monopanel front with hot asphalt cement provides superior vapor barrier.



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HAGERSTOWN, MARYLAND, U. S. A.

The oldest and largest builder of cold storage doors in the world

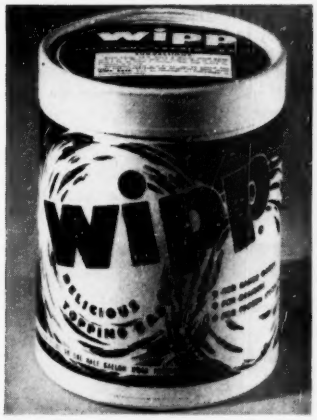
Only Jamison doors give you these extra features. For complete information and specifications, write for catalog 199.

JAMISON COLD STORAGE DOOR CO. • HAGERSTOWN, MD., U. S. A.

Spoon-Handled Tea Bag A

Added consumer convenience is the theme of the "spoon-lift" tea bags pictured above. The beverage is quickly prepared merely by slipping the spoon inside the paper strap and "dunking" the bag. Later, the bag is lifted out the same way and left on the saucer.

Tests show that the strap will withstand a good bit of swishing around in the cup. Servit Foods Corp., New York City, packs 50 of these single-cup orange pekoe tea bags to the box.



New Topping Base B

Having been sold in test areas for one year, Wipp, a new topping base, is now ready for national distribution to bakers, restaurants, and ice cream makers.

When diluted and whipped with either milk or cream, it readily achieves over-run in a light, fluffy and stable whipped topping. In this state, it can be worked through a pastry tube, or cream or jelly pump, and still retain sharp design lines. The topping has been prepared so it will not leak or collapse on baked goods, salads, desserts, or frozen novelties, even after thawing.

Basic ingredients are: Non-fat milk solids, pasteurized whole and skim milk, vegetable oils, cane sugar, vanilla, and stabilizers. The maker is Wipp Foods, Rochester, N. Y.

Unit Prepackage C

There is now growing use of unit prepackaging of fragile fruits and vegetables, such as illustrated by the window carton pictured above. Here, peaches from Hill County Fruit Co-Op Inc., Stonewall, Tex., are fully protected at all times by the cardboard bulkheads in the container.

Since the Lumarith window permits oxygen to get in and carbon dioxide out, peaches are kept at optium freshness. Fogging, which can cause mold or slime growth, is eliminated.

Moistureproof Film D

Superior moisture protection, improved package appearance, and extra product visibility are claimed for new cellophane 450 K-202, developed by the Du Pont laboratories. Satisfactory performance has been demonstrated on wrapping, bag-making, forming and filling machines.

Being moistureproof, the new film resists damage by contact with abrasive, oily, greasy, salty, syrupy, and highly seasoned foods. It does not

Here's one PROFITABLE MILK RUN!

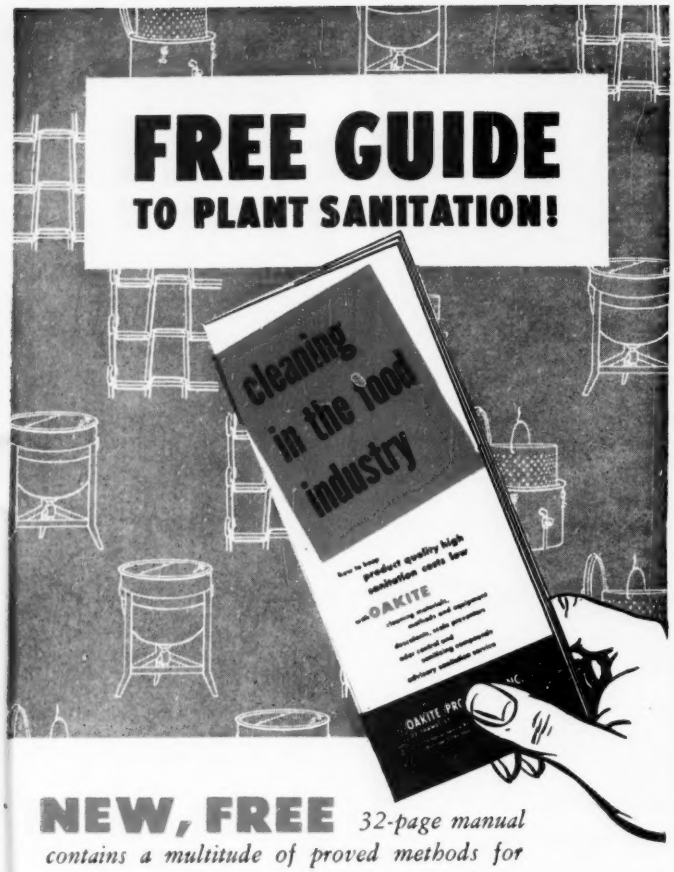
BUSCHMAN
CABLE TROLLEY CONVEYORS

BUSCHMAN Cable Trolley Conveyors are a low cost easily installed profit boon to food process plants. A mid-western dairy *conveys* milk cans from sterilization to filling stations or storage—freeing floor space and utilizing unused ceiling space. Can denting is reduced, sanitation increased while trucks and other handling devices are eliminated.

To reduce handling and increase profits in *your* plant—investigate BUSCHMAN "UNIVERSAL" Trolley Conveyors. Write for Bulletin #41.

Buschman Conveyors

THE E. W. BUSCHMAN CO., INC.
4475 Clifton Ave. Cincinnati 32, Ohio



NEW, FREE *32-page manual contains a multitude of proved methods for saving money on plant sanitation procedures. Let us send you a copy. There's no obligation.*

Once you get your hands on a copy of the Oakite Booklet—"Cleaning In The Food Industry"—you'll find yourself referring to it time and time again for information on such subjects as:

- Cleaning stainless equipment
- Descaling water-holding units
- Chemical sterilization
- Odor control
- Bacteria control
- Cleaning aluminum equipment

So, send for this booklet. Chances are you'll come across just what you're looking for to help simplify your sanitation program . . . lower your sanitation costs.

More For Your Cleaning Dollar

If you're looking for ways to stretch your cleaning dollar, investigate specialized Oakite cleaning compounds, modern Oakite manual and mechanical cleaning methods. You can count on getting the best that money can buy. You can count on getting real, live, on-the-spot service from a man who knows cleaning . . . knows where and how to cut cleaning corners. Yes, for "Stem-to-Stern" sanitation consult Oakite—first.

OAKITE PRODUCTS, INC., 26G Thames St., NEW YORK 6, N. Y.
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OAKITE

SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

shrink, and it is said to remain smooth and fresh looking, with little tendency to pucker. The film comes in 450 gage, with an area factor of 14,000 sq. in.

Canned Dinner Specials A

Three new canned items have recently been offered by Kingan & Co., Indianapolis. They are: Lima beans with sauce and ham, in a 16-oz. can; noodles and beef with sauce, 16-oz. can; and smoked pork sausages, packed in brine, in a 7-oz. can.

The lima bean product contains dried butter-beans with chunks of ham, while the noodles include one-piece of beef large enough for slicing.

All three specialties are under the company's new labels, in blue and bright yellow. Appetizing pictures of the foods appear on the labels.

New Process Cheese B

This Red Rooster Port du Salut pasteurized process cheese, introduced only a few short weeks ago, is already reported to be in good demand. It is carried in a rigid plastic container.

The cheese is run into the container while hot and is sealed immediately, thus assuring sterilization of container and closure as far as yeast and molds are concerned. This operation eliminates air pockets, which might foster

Guard Against Atmospheric Hazards...

WITH

Century PROTECTED MOTORS

Drip Proof

Splash Proof

Totally Enclosed Fan Cooled

Explosion Proof

Century MOTORS

ALTERNATING CURRENT MOTORS

POLYPHASE

Squirrel Cage Induction — 1/6 to 400 H.P.
Wound Rotor Motors—1 to 400 H.P.
Synchronous Motors—20 to 150 H.P.

SINGLE PHASE

Split Phase Induction—1/6, 1/4, 1/3 H.P.
Capacitor—1/6 to 20 H.P.
Repulsion Start, Brush Lifting, Induction—1/2 to 20 H.P.

DIRECT CURRENT MOTORS

1/6 to 300 H.P.

GENERATORS

AC, .63 to 250 KVA
DC, .75 to 200 KW

GEAR MOTORS

1/8 to 1-1/2 H.P.

MOTOR GENERATOR SETS

AC to DC, AC to AC
DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof.

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

CE-673

To guard your production against the destructive effects of atmospheric hazards, Century offers four types of protective motor frames.

DRIP PROOF—meets the requirements of most installations. Use it where operating conditions are relatively clean and dry. Top half of the frame is enclosed to keep out falling solids and dripping liquids.

SPLASH PROOF—keeps splashing liquids out of the motor even when the frame is washed with the full force of a hose. Use Century Splash Proof motors indoors or outdoors.

TOTALLY ENCLOSED FAN COOLED—resists the hazards of abnormal concentrations of dusts, powders, grit, oil mists, acid and alkali fumes.

EXPLOSION PROOF—protects life and property in atmospheres charged with explosive dusts or vapors.

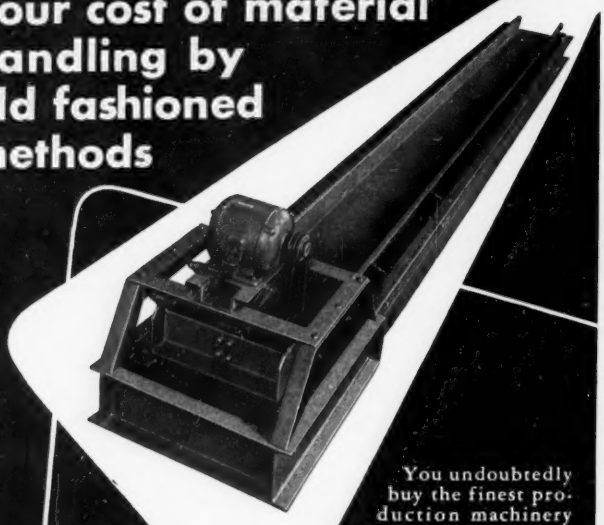
The properly selected protection with the wide variation of starting torque characteristics to choose from provides long operating life and improves the production of the driven equipment.

Century motors are available in a wide range of kinds and types—in sizes from 1/6 to 400 horsepower—for single phase, polyphase and direct current applications.

Specify Century motors for all your electric power requirements.

CENTURY ELECTRIC CO. 1806 Pine St. • St. Louis 3, Mo.
Offices and Stock Points in Principal Cities

Never underestimate your cost of material handling by old fashioned methods



You undoubtedly buy the finest production machinery that is made. However, production and cost accounting authorities agree that the most important way to effect savings today is to effect economies in materials handling.

Regardless of whether you measure in pounds, tons, dollars or all three, material handling cost is one of today's most serious problems of business in general and your business in particular.

HOW AJAX LO-VEYORS CUT COSTS

Exclusive Ajax Lo-Veyor design is responsible for low cost handling of bulk materials and equally important low maintenance cost,— and here's why:

1. Only three basic parts — pan or tube . . . vibrating mechanism . . . motor.
2. Completely self-contained — ready for use.
3. No exposed bearings, no eccentric shafts, no idler and tail pulleys.
4. Pan or tube made of ferrous or non-ferrous metal.
5. Covered pan or tubular Lo-Veyors provide gas-tight construction for critical processes and explosive operations.

Used by leading chemical, food, foundry and other manufacturers.

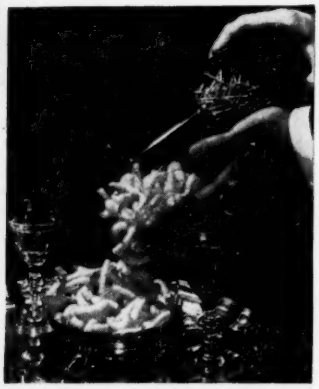
Write giving outline and sketch of your requirements for handling dry materials.

AJAX FLEXIBLE COUPLING CO. INC. WESTFIELD, N. Y.

yeast or mold spores on surrounding surfaces. And it prevents entrance of atmospheric oxygen, which yeast or mold spores need for growth.

The paper liner, which also serves as a label, fits snugly on the surface of the cheese and is the seal lining.

The manufacturer, Frank Ryser Co., Mayville, Wis., says refrigeration of its product is beneficial, but not essential unless it will be stored or held on retail shelves for a considerable time.



Two-In-One Package A

"Double Header" packaging is an idea offered by Eastman Kodak Co., Rochester, N. Y., manufacturer of the Kodapak cellulose sheets. Company's laboratory, engaged in finding new uses for Kodapak sheets, feels that packagers of two related items could pack and sell them together to good advantage. Shown in picture are cheese tidbits and pretzels.

Package & Product Shorts

Introduce Lemonade Concentrate B

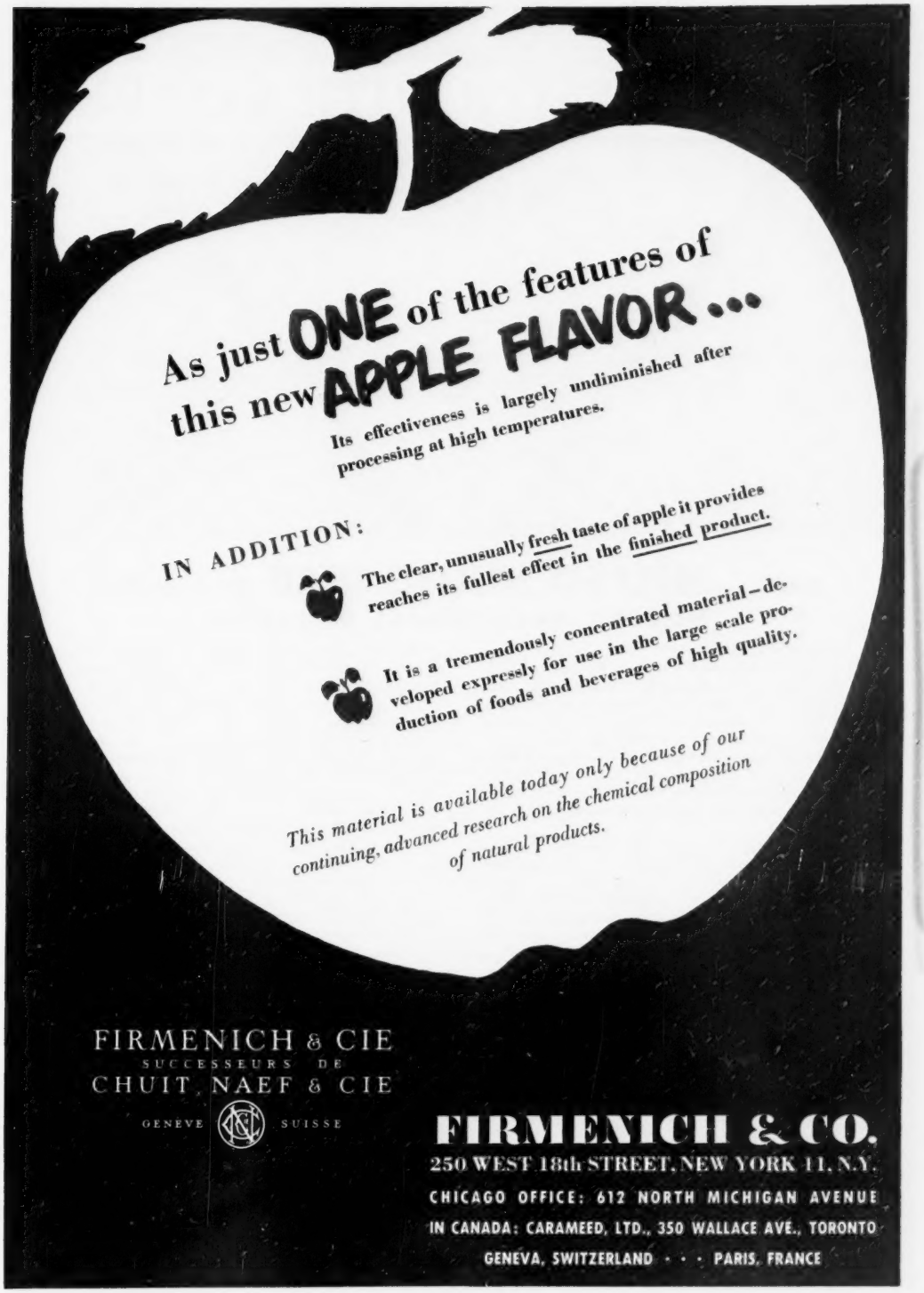
Quick-frozen lemon concentrate for making lemonade is now being marketed nationally by both Snow Crop and Minute Maid Corp. Former's new product is packaged in a 5-oz. lithographed can, which when reconstituted with 5½ cans of water, makes a full quart of fresh lemonade. Latter firm uses 6-oz. can, calling for addition of 1 qt. of water.

New Smooth Chocolate Drink C

A chocolate drink made by a new process called "rotogizing" has been introduced by Golden State Co., Ltd., San Francisco. The unit employed blends the chocolate syrup into a smooth, homogeneous mix resulting in a chocolate drink requiring no aging.

Small-Family Canned Goods Line D

Van Camp Div., Stokely-Van Camp, Inc., Indianapolis, announces a small-family size line of canned goods. Fourteen of the company's leading items are packed in the "just-right-for-two" 8-oz. cans. Items include all combinations of beans, chili con carne, tamales, and Vienna sausage.—*End*


As just ONE of the features of
this new APPLE FLAVOR...
Its effectiveness is largely undiminished after processing at high temperatures.
IN ADDITION:
The clear, unusually fresh taste of apple it provides reaches its fullest effect in the finished product.
It is a tremendously concentrated material—developed expressly for use in the large scale production of foods and beverages of high quality.
This material is available today only because of our continuing, advanced research on the chemical composition of natural products.
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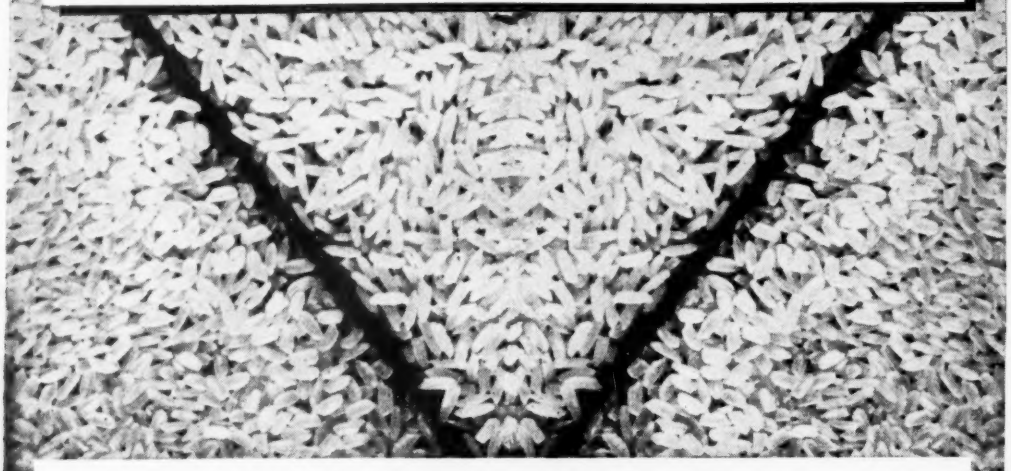
One of a Series Dedicated to the Nutritional Advances of the Food Industries

KEEPING FAITH WITH NATURE



NOW...MILLED WHITE RICE CAN MEET MODERN NUTRITIONAL DEMANDS

Nutritionists, Government authorities and cereal processors the world over will, we believe, welcome this Hoffmann-La Roche news. For until peoples of the great rice-eating nations can enjoy a state of health free from beriberi and other effects of malnutrition, world trade and international security will be deprived of a most essential guarantee. A nation cannot be BOTH productive and happy without good health. Now it can be both even if its people's principal staple food is milled white rice.

Enrichment of wheat flour, macaroni products and corn meals was a relatively simple problem which Roche chemists and technical experts helped to solve. However, the popular practice of washing or rinsing rice before cooking renders the usual type of enriching premix useless since the vitamin content dissolves in the water and is lost. As a leader in world production of vitamins, Hoffmann-La Roche looked for a means of hurdling this difficulty, found it, and its patented processes have been made available to the rice milling industry.

Going further, and to demonstrate conclusively that addition of lacking vitamins and minerals to a staple food cereal was a practicable and easy means of correcting dietary deficiencies, Hoffmann-La Roche joined with four other participants in making possible the greatest nutritional experiment* of all time. Involving 100,000 Philippine people, this experiment has furnished proof with which flour millers, bakers and other cereal processors can overcome the "doubting Thomases" of "enrichment."

Ask to see, and if you eat rice insist upon being served, the new "nutritionally improved" milled white rice carrying thiamine, niacin and iron at the same minimum per pound levels as enriched white wheat flour and corn products.

*The experiment is under the joint auspices of the Williams-Waterman Fund, Republic of the Philippines Department of Health, United States Public Health Service Rehabilitation Program, National Rice and Corn Corporation of the Philippines and Hoffmann-La Roche Inc. Preliminary reports published thus far have appeared in the Journal of Nutrition of August 1949, Journal of the Philippine Medical Association, November 1949, and the Rice Journal of April, 1950.

ENRICHMENT 'ROCHE' VITAMINS

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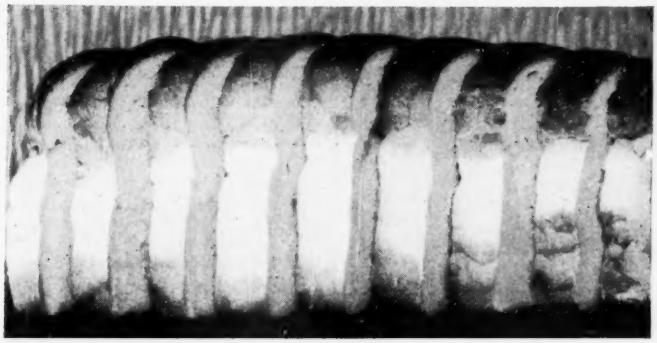
New Technology



Inverting Proofed Bread Before Baking Improves Loaf's Texture and Looks

Introducing a simple but novel step in the baking of bread is the basis of a patented process said to produce a finer and more uniform texture in the loaf and improvement in the color and appearance of the crust. During the conventional step in baking known as "proofing," the dough rises somewhat under fermentation action. There is a tendency for gas and air to be occluded or dissolved in the moisture of the dough; also a tendency for this moisture to gravitate to the bottom of the pan while standing during proofing. The novelty of the invention resides in the simple step of turning the proofed loaf upside down and baking it in this position. The wetter portion will thus be exposed to the higher temperature to which the upper part of the loaf is usually exposed in baking, and the dissolved or occluded gases will be gradually vaporized and perform their function in aerating the loaf more uniformly than if they were driven off from the bottom of the loaf. The concentration of sugar in the wetter, or upper, part of the loaf will also enhance the usual caramelization and improve the appearance of the resulting loaf.

Simple mechanical means are provided for the process. Pan-like frames with removable top and bottom plates are used instead of the conventional pans. During the proofing operation the dough rests on a bottom plate. Before baking, a top plate is placed on the frame, and the latter is inverted. The original bottom plate is then removed.

Digest from U. S. Patent 2,495,469, issued Jan. 24, 1950, on an application dated June 16, 1944, to R. L. Nafziger, Chicago, Ill.

SUGARS

Ion Exchange Resins Bleach Sugars

Color reduction in sugar solutions during their passage through beds of synthetic ion exchange resins has often been observed. The reduction is more or less coincident with a pH decrease, though resins differ in their color removal and ion exchange properties, depending to some extent on the type of sugar solution. Thus, two polyamine resins which give nearly parallel results on a second carbonation thin juice from beet sugar at 13.4 deg. Brix, behaved quite differently in removing color from diluted corn syrup molasses (Hydrol) of 3.5 Brix.

A third type of resin, which is essentially non-ionic (Duolite S-30), removed color from both types of solution at about the same rate. Color removal after the passage of 30 volumes of effluent per volume of resin was still about 80 percent, while the pH of the effluent remained constant. Of the three types of color bodies found in factory sugar juices, the resin removes caramels and melanidins effectively; it is much less efficient in removing polyphenolic compounds.

Digest from "Color Removal in Sugar Liquors by Synthetic Resins" by I. M. Abrams and B. N. Dickinson, *Industrial and Engineering Chemistry*, Vol. 41, No. 11, 2521–23, Nov. 1949.

MEATS

Dehydration Ups Shelf-Life Of Canned, Sliced Bacon

Keeping quality of mildly-cured, vacuum-packed, sliced bacon can be greatly increased by dehydration to a moisture-salt ratio not exceeding 5:1. Ethylene oxide is effective as a sterilizing agent for the bacon. Exposure before canning, for sufficient time and at a strength necessary to assure sterility, produced a dull-brown color and an abnormal odor. When as much as 1 ml. ethylene oxide was added directly to the can, however, bacterial count of the bacon was greatly reduced, and no off-color or odor developed. No study was made of possible toxic effects of the ethylene oxide.

These are conclusions reached in a study seeking to develop a means for improving keeping quality of mildly-cured, sliced, vacuum-packed bacon when stored at relatively high temperatures.

Methods of dehydration tried were: Heating at 120 F. in the smokehouse after curing and smoking; heating in a dehydrator of cabinet type at 120 F. with forced air circulation; and freezing, thawing and pressing before curing. Best results were obtained by heating for 6 days in the smokehouse. As an example, one sample given this treatment, had a moisture-salt ratio

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of 4.95:1, and was stored for 120 days at 100 F. without producing swollen cans.

Bacterial determinations, made on samples from swollen cans, indicated that spoilage was due to growth of many species of microorganisms normally found in bacon, and were mainly members of the genus Micrococcus.

Digest from "Variations in Protein Contents Quality of Bacon," by O. C. Hankins, W. L. Sulzbacher, W. R. Kauffman and M. E. Mayo, *Food Technology*, Vol. 4, No. 1, 33-38, Jan. 1950.

CEREAL PRODUCTS

Wide Variations Observed In Wheat Kernel Protein

Wheat is usually handled in bulk, and in the course of its movement from farm to markets and its distribution to points of use, streams of the same grade from a large number of farms and areas are combined. This blending results in a considerable degree of uniformity when samples are taken. Variations do occur, however, and some of these can be traced to variation in protein content of single kernels. In wheat of the Red Bobs variety from experimental plots, the protein content of individual kernels ranged from 10.5–18 percent. Marquis wheat showed protein ranges of 11.5–17.5; 7.0-14.5; and 14.5-21.5 percent from different plots in Saskatchewan and Alberta. Kernels from a single 10-ft. row of Thatcher wheat varied from 15–18 percent. Within a single head of wheat a variation of as much as 6 percent can be expected. Where several stalks (tillers), each bearing a head, occur on the same plant, there is some tendency for the shorter tillers to bear heads of higher protein content, but this is not invariably the case. The top kernel in each spikelet of a head tends to be lower in protein than the remaining kernels.

Digest from "Variations in Protein Contents of Plants, Heads, Spikelets, and Individual Kernels of Wheat," by I. Levi and J. A. Anderson, *Canadian Journal of Research*, Vol. 28F, 71-81, March, 1950.

VITAMINS

Natural Ascorbic Acid From Walnut Hulls

Walnut hulls, of which about 50,000 tons are produced yearly in California alone, are one of the richest natural sources of ascorbic acid. On a wet basis they contain 0.4-0.8 percent or 2.5-5.0 percent on a moisture-free basis. Because of the ease with which it is oxidized by air, loss of ascorbic acid from the pieces of walnut hull is very

rapid unless they are frozen, in which condition it is stable for a year or longer.

By extraction with dilute SO_2 solution, oxidation is avoided and the ascorbic acid can be adsorbed on anion exchanger resins and eluted from them with 0.2 normal HCl. Eluates are yellowish in color, but may be decolorized with activated carbon. Following concentration to 70 percent solids (36 percent purity) the ascorbic acid crystallizes out at 40 F. after several days. Yields of 25 to 50 percent of the initial ascorbic acid content have been obtained in laboratory and pilot plant runs, and a yield of 25 percent is conservatively estimated for a full-sized operation.

Disadvantages of the process are: High dilution of original extract, and the low capacity of the exchange resins for ascorbic acid. The very short operating season (1 month) and the large investment necessary for handling and concentrating the dilute solutions make the method unattractive from a commercial standpoint.

Digest from "Ascorbic Acid from Walnut Hulls" by A. A. Klose, J. B. Stark, G. G. Purvis, Jean Peat and H. L. Fevold, *Industrial and Engineering Chemistry*, Vol. 42, 387-91, Feb. 1950.

FRUITS AND VEGETABLES

Vacuum-Ice-Dried Green Peas Retain Flavor and Vitamins

Drying rate for frozen green peas is affected by the air pressure (degree of vacuum), vapor pressure, and rate of heating. In an incomplete state of dryness peas have a completely dry exterior and one or more frozen undried nodules in their interior. Drying, therefore, requires the flow of water vapor from the interior, where vapor pressure is comparatively high, to the exterior where it is low. When the heating rate is constant, a critical ratio of internal to external vapor pressure will be reached, beyond which no change in vapor pressure, and hence no change in temperature, will occur. If temperature of the peas is the primary factor affecting their quality, rate of heating is of greater importance than air pressure or condenser temperatures.

In experimental drying, there were no appreciable differences in quality of peas dried at low temperatures to water contents of 3-4 percent with varying rates of heat application. Total drying time ranged from 9½ to 57½ hr. and heating rate from 3.4 to72 cal./sq. cm./hr. Peas dried at 140 F. were inferior to those dried at a low temperature. On a scoring basis of 6 for excellent, the vacuum-ice-dried

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peas scored 4.2, the same as undried controls held frozen at 4 F. Peas dried at 140 F. scored 3.2. Packing density was about 0.3 g./cc. for vacuum-ice-dried peas and 0.50 g./cc. for air dried. There was an apparent gain in ascorbic acid content from 0.57 to 0.63 mg./g. for the vacuum dried peas, probably caused by alterations in structure during drying.

Digest from, "The Low-Temperature Vacuum Drying Process Applied to Green Peas. Part II." by A. J. Ede, *Journal of the Society of Chemical Industry*, Vol. 68, 336-40, December, 1949.

Vacuum Processing Apples Prevents Browning

Comparisons were made between 2 vacuum processes for inhibiting browning of apple slices for freezing or canning: (1) Subjecting them to a 26-in. vacuum for 30 min., while submerged in a 30 percent sucrose solution containing 0.1 percent ascorbic and 0.1 percent citric acids, and (2) vacuumizing slices in a 5 percent NaCl solution containing 1.0 percent citric acid.

Both methods yielded a finished product of bright, typical color, with slightly translucent appearance. Texture of brine-treated slices was more firm than syrup-treated samples, also slightly salty in taste. Flavor of syrup-treated product was better, but it cost 2-3c. more to produce. Addition of Calcium salts had a beneficial effect on texture of soft storage apples used for canning but not upon soft fruit used for freezing.

Digest from "Sirup Impregnation of Apple Slices For Freezing," by J. B. Wegener, *Report of Proceedings,—Conference on Deciduous Fruits* Eastern Regional Research Laboratory, Philadelphia 18. 15-16, Feb. 6-7, 1950.

SANITATION

Combination Disposal System For Yeast Plant Wastes

A combination of anaerobic digestion and trickling filters has been used to reduce the B.O.D. of wastes from the Anheuser-Busch yeast plant at Bound Brook, N. J. by 80–90 percent.

The disposal plant consists of 2 equilization tanks, one receiving concentrated waste and the other dilute; 2 steam-heated digesters in series, 2 settling tanks, and 2 trickling filters 4 ft. deep. Wastes are introduced into the bottom of the first digester and flow upwards through the sludge blanket to peripheral overflow weirs. A hopper bottom settling tank receives the overflow from the second digester. Sludge is returned to the digesters and effluent goes to the trickling filters. A final settling tank takes the sludge

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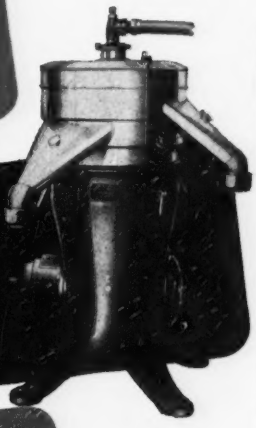
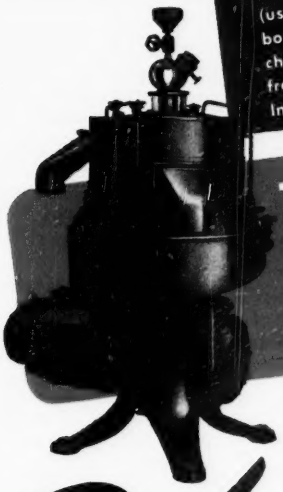
ONE-WAY SEPARATION

Usually called clarification because it involves removing a solid from a liquid, such as removing burnt crumbs from cooking fat, or tiny seed and dirt out of tomato puree. For these applications a De Laval Multiple Clarifier is used.



TWO-WAY SEPARATION

Separating two liquids of different specific gravities, simultaneously removing small quantities of solids (usually less than 0.5%) and storing them in the bowl. Typical applications: skimming grease from chicken broth; polishing olive oil; recovering oil from spoiled mayonnaise. Machine used: De Laval Industrial Separator.



THREE-WAY SEPARATION

Continuous separation of two liquids and simultaneous continuous removal of solids from the liquid mixture. Typical applications: separating fish oil from press liquor; citrus oil from fruit juice and pulp. Machine used: De Laval "Nozzle-Matic" Separator.

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C SK Fig. 1891 Rotameters measure flow of aromatic aldehydes in a chemical plant.

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from the 2nd filter and discharges the effluent to the sewers.

Ripe sludge has remained viable for 5 yr., and there has been an accumulation of 55 cu. ft. of wet sludge for every million gal. of waste digested. Operating records indicate that B.O.D. removed increases with B.O.D. loading up to a maximum digestion efficiency of 95 percent B.O.D. reduction at a loading of 0.1 lb. per cu. ft. per day. At lower loadings there is insufficient food supplied for optimum biological activity; at higher loadings seed is insufficient to handle all the organic matter.

Digest from "Treatment of Compressed Yeast Wastes," by W. Rudolfs and E. H. Trubnick, *Industrial and Engineering Chemistry*, Vol. 42, No. 4, 612-15, April, 1950.

DAIRY

Frozen Confection Has Fruit Core

Novel among confections in the form of ice cream on a stick is one recently patented that contains a core of fresh fruit, such as banana, melon, peach, pear, or pineapple, or grouped portions of berries and fragments of fruits. Although the outer envelope of ice cream and the coating of chocolate and nuts are formed at a temperature below freezing, the fruit core does not chill to a point where it will crystallize or solidify. In manufacture, the fruit core is impaled on a stick, placed in a mold containing the desired quantity of soft ice cream, and frozen in a brine tank. One or more additional coatings may then be added, for example, chocolate and ground nuts. The finished confection is suitably packaged for distribution or sale.

Digest from U. S. Patent 2,495,403, issued Jan. 24, 1950, on an application dated July 30, 1947, to C. L. Bernards, San Leandro, and Robert Bernards and Parley Bernards, Castro Valley, Calif., and assigned to John M. Bernards & Sons, Inc., Ashland, Calif.

Improved Alginate Stabilizer For Frozen Milk Products

Gelatine and the alginates are competitive in ice cream stabilizing compositions, each having compensating advantages and disadvantages. Undesirable properties of alginate stabilizers heretofore prepared are the relatively high temperature required to bring the stabilizer into solution in the mix, slow flow of the mix over the cooler, and incompatibility with the mixes that require neutralization.

These drawbacks are overcome in a new product recently patented. Whereas the older compositions were blends of an algin having a high viscosity-producing characteristic, the present

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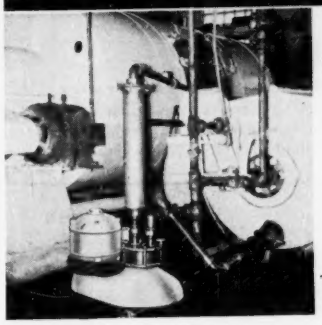

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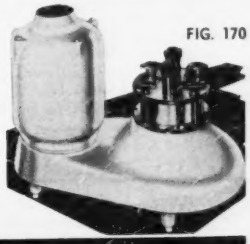
FIG. 170



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No. 322 Radiant Roaster with Color Controller	F-1
No. 248 Butter Mill	F-2
No. 341 Split Nut Blancher	F-5-A
No. 346 Whole Nut Blancher	F-6
No. 303 Butter Mill	F-9
No. 305 Metering Unit for FIX and FIX-M	F-11
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invention contemplates the substitution of a low-viscosity algin. Otherwise the compositions are identical.

Alginic acid, being a long chain polymer of anhydro-D-mannuronic acid residues, shows increasing viscosity in an aqueous solution of given concentration as the chain length increases. But inasmuch as the acid may be depolymerized, it is possible to prepare and select an alginic acid having any desired viscosity producing value.

The new composition is, therefore, formed from a selected alginic acid by mixing dry sodium carbonate with moist alginic acid in combining proportions, adding a suitable quantity of sugar, dextrine, or other dispersing agent, then sodium phosphate, and finally drying and grinding. The new alginic acid is said to have a viscosity not exceeding 10 sec. Woolwich or 500 centipoises.

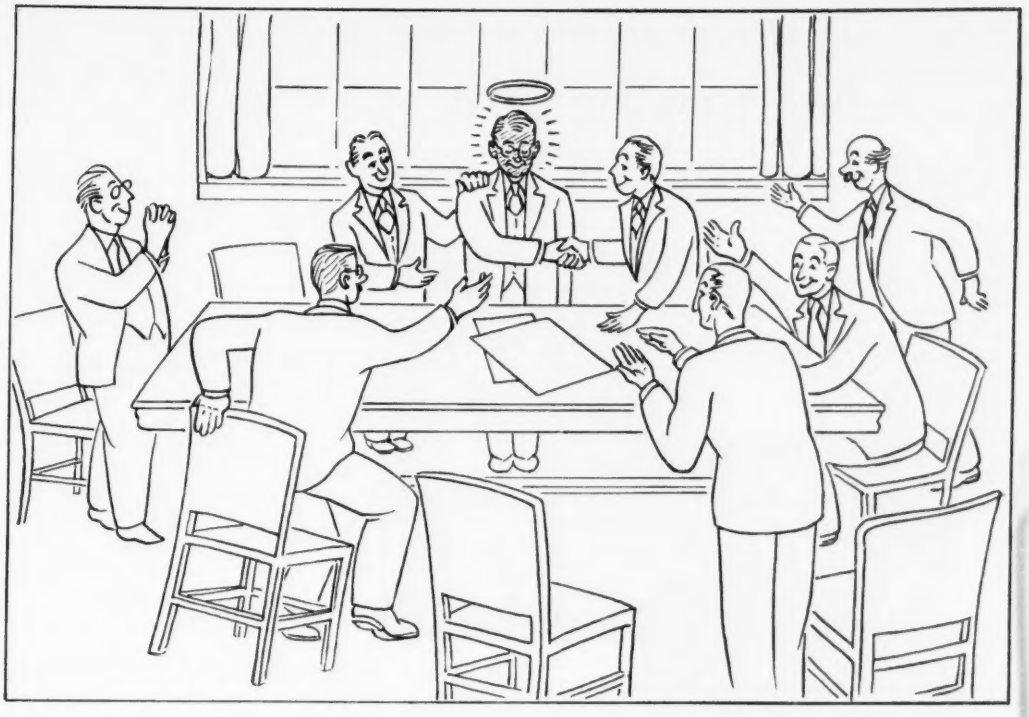
Digest from U. S. Patent 2,485,934, issued Oct. 25, 1949, on an application dated Oct. 21, 1946, to A. B. Steiner, La Jolla, Calif., assigned to Kelco Co., San Diego.

MISCELLANEOUS

Compares Nutritive Values Of Butter and Margarine

Fortification of oleomargarine with vitamins, and proof that all animal and vegetable fats are almost completely absorbed from the human intestines, provided they are liquid at body temperature, tend to dissipate two of the earlier claims of superiority of butter over margarine. Even the contention that small quantities of vaccenic acid in butter promoted growth in rats has not been confirmed in recent trials. Controlled experiments in Germany have shown that margarine is in no way inferior to butter as a source of fat for growing children, although for psychological reasons colored margarine was preferred. In its flavor, however, butter has a useful function in stimulating appetite in both human beings and rats. The latter have been found to prefer a diet flavored with diacetyl, which stimulates the natural taste and aroma of butter.

Shortage of butterfat in India has increased the consumption of hydrogenated oils, known locally as *vanaspatis*. Experiments have been reported in which the nutritive properties of *vanaspatis* were compared with those of *ghee* (butterfat). When various fats were added to liberal basal rations for rats, the animals receiving butterfat had no greater rate of growth than those receiving the fat component in the form of a *vanaspati*. But when fats were added to a less adequate basal ration, the main constituents of which had been freed from fat by ex-



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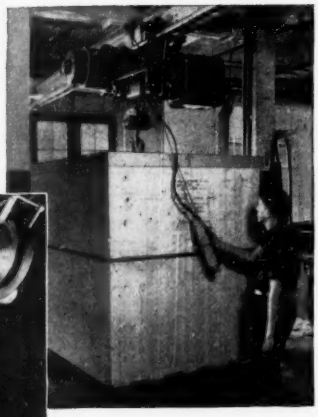
City..... State.....

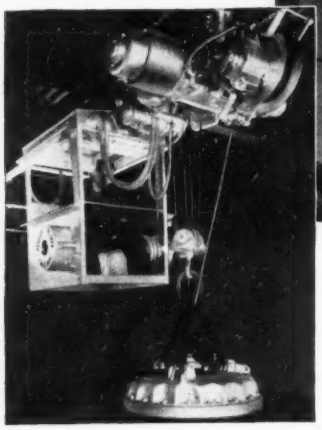
Bothered by a lifting or conveying bottleneck?

Reduce Handling Costs With the Right TYPE of Hoist

1. Floor-controlled

with the operator primarily occupied with other duties. For quick, efficient handling of relatively "short hauls" without disturbing surrounding operations.





2. Cab-operated

operator in cab, traveling loads at speeds of 500 f.p.m. or more—and occupying the best vantage point for accurate spotting or stacking.

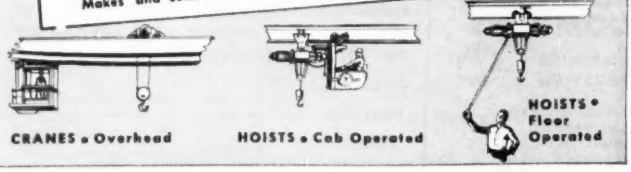
Floor-controlled? Cab-operated? Both are production boosters—but one is best for *your* job. We would like to work with you to determine the right type for your particular service.

We have given our complete attention to the manufacture of both types of hoists—and a complete line of overhead cranes—for a good many years. So we approach "through the air" handling with an open mind and a great deal of experience. May we show you pertinent data on installations similar to yours?

Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads



422 SCHUYLER AVENUE • MONTOUR FALLS, N.Y.

traction, and in which fat-soluble vitamins were at sub-optimal levels, definite superiority for butterfat was obtained. Those animals of the second and third generation, that had received the butterfat grew more rapidly than those receiving *vanaspatis*.

Experiments have also been made on the effects of various dietary fats on the metabolism of Ca and P by adding the fats to an otherwise fat-free diet. Fats tested included butterfat or *ghee*, crude and refined groundnut, sesame, and cottonseed oils, and various hydrogenated forms of these oils with melting points from 36–43 deg. C. The absorption of Ca was not significantly lower with refined vegetable oils and low-melting *vanaspatis* than with *ghee*, but was decreased with high-melting *vanaspatis* and crude cottonseed oil containing gossypol. The absorption of P followed the same general pattern.

Digest from "The Nutritive Value of Butterfat," by R. Chanda, *Food Manufacture*, 499-501, Nov. 1949.

New Type Beer Barrel Has Rubber Lining

A novel type of barrel for beer or other carbonated beverages was patented in Belgium during the war. One head was replaced by a metal plate to which was clamped a rubber pocket or lining large enough to fill the barrel completely when it was fully distended. In the center of the plate was a filling boss with a flapper-type closing valve inside the barrel. By applying pressure at the bung and opening the filling valve, the rubber lining could be completely collapsed against the metal end-plate of the barrel.

With the lining collapsed, the barrel can be filled with beer without loss of CO_2 or the introduction of air. No isobarometric filling machine is required. The barrel need not be lined with pitch and can be made from woods other than oak. Using the rubber, CO_2 is not lost through the wood, nor can infection be imparted to the beer by the wood. No change is said to occur in the beer even after several weeks.

The package is still in the trial stage, one of the difficulties being to find a rubber-like material for the lining that will not impart a taste to the beer. Nevertheless, it is likely that perfection of this barrel will slow down the spread of bottled beer in Belgium, where the expense of pasteurization is giving the numerous small breweries a great deal of concern.

Digest from "The Technical Developments of Belgian Breweries During and After the War," by J. De Clerck, *Echo de la Brasserie*, 967-8, Nov. 11, 1949.

—*End*

Top performance for tough jobs!

Chevrolet P•L Truck performance consists of many things. There is Chevrolet design—brilliant and functional—design with a purpose. There is Chevrolet construction—sturdy and dependable—for lasting usefulness.

And there is Chevrolet power—power to deliver the goods—more power than Chevrolet trucks ever had before. Two great valve-in-head engines—the Load-Master 105 h.p. and the Thrift-Master 92 h.p.—make these the most powerful Chevrolet trucks ever built.

These new P•L models are far ahead in features, too; yet they cost surprisingly little to buy, to operate, to maintain. And that adds up to value—the kind of outstanding value that year after year makes Chevrolet America's fastest selling truck.

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICH.

LEADING WITH ALL THESE PLUS FEATURES:

• TWO GREAT VALVE-IN-HEAD ENGINES: the New 105-h.p. Load-Master and the Improved 92-h.p. Thrift-Master—to give you greater power per gallon, lower cost per load • THE NEW POWER-JET CARBURETOR: smoother, quicker acceleration response • DIAPHRAGM SPRING CLUTCH for easy action engagement • SYNCHRO-MESH TRANSMISSIONS for fast, smooth shifting • HYPOID REAR AXLES—5 times more durable than spiral bevel type • DOUBLE-ARTICULATED BRAKES—for complete driver control • WIDE-BASE WHEELS for increased tire mileage • ADVANCE-DESIGN STYLING with the "Cab that Breathes" • BALL-TYPE STEERING for easier handling • UNIT-DESIGN BODIES—precision built.

CHEVROLET P•L* ADVANCE-DESIGN TRUCKS

P*opularity L*eaders

Chevrolet trucks outsell all others. In every postwar year truck users have bought more Chevrolets than any other make—*proof* of the owner satisfaction they have earned throughout the years.

P*erformance L*eaders

The new Chevrolet P•L trucks give you high pulling power over a wide range of usable road speeds—and on the straightaway, high acceleration to cut down total trip time.

P*ayload L*eaders

The rugged construction and all-around economy of Chevrolet P•L trucks cut operating and repair costs—let you deliver the goods with real reductions in cost per ton per mile.

P*rice L*eaders

From low selling price to high resale value, you're money ahead with Chevrolet trucks. Chevrolet's rock-bottom initial cost—outstandingly low cost of operation and upkeep—and high trade-in value, all add up to the lowest price for you.

CHEVROLET

Can it be canned?

CHECK WITH CONTINENTAL

Continental has the right package for everything from spice to syrup. Our cans for the food field come in every practical size and shape. And we are ready to sit down with you and talk over your packaging requirements.

Packaging plans call for lithographed labels? Continental's master lithographers take pride in making each can its own point of sale display. Brilliant colors and clear lettering are a big help against competition — particularly in self-service markets.

You will rate Continental service tops too. We have both the research facilities to meet your technical problems and the manufacturing capacity to assure you of a dependable source of supply.

Why not check with Continental today?

You can't beat Continental as a dependable source of supply!

CONTINENTAL CAN COMPANY

100 East 42nd Street — New York City 17, N. Y.

USBF OFFICERS: Left, E. V. Lahey, Smith Bros., New Bedford, Mass., president and chairman; A. A. Busch, Jr., Anheuser-Busch, 1st vice-chairman; R. G. Jones, Jackson Brewing Co., 2nd vice-chairman; R. T. Riney, Sterling Brewers, secretary.

Brewers Talk Management

Hear reports on dried yeast uses and on the full scope of management problems at Foundation convention

Research, packaging and public relations held conspicuous places at the 74th annual convention of the U. S. Brewers Foundation, in San Francisco early in May. These topics, along with all phases of marketing, were presented to top management representatives of most of the nation's producers of beer and ale.

The work of Clive McCay, Cornell University's noted nutritionist, in both demonstrating the value of brewers' dried yeast and in showing in what forms it could be best employed, was discussed by J. S. McCourtney, president, Brewers Yeast Council. This yeast, Mr. McCourtney said, is now being used in bread, candy, baby foods and meat products. The council's own research, he reported, included analytical data on compositions and vitamin and protein assays of brewers' yeast. The presence of betaine, a breakdown of Choline, he continued, was established in one sample. This work is being continued because of betaine's great importance in animal and human nutrition. Preliminary research has also established evidence that brewers' dried yeast has antioxident properties and may find many uses in foods and feeds as an agent for retarding both loss of vitamins and the development of rancidity.

Control of packaging functions was described as one of industry's "horribly weak points" by L. V. Burton, executive director, Packaging Institute, New York City. A standardized system of cost accounting for packaging was strongly urged by Dr. Burton, not only for brewers, but for all consumer industries. He listed six points for study of cost analysis: 1. Where does packaging begin and where does it end? 2. Does packaging cost include bottle washing and pasteurizing? 3. Does it include maintenance, depreciation, obsolescence? 4. Does it include departmental supervision and overhead? 5. Does it include general overhead and engineering expense? 6. Does it include all or only part of label expense? The last question, he observed, raises disputes among packaging, advertising and sales promotion departments that can run on endlessly. It doesn't matter who is charged with what, he said, so long as the system is standardized. But you may find, he went on, that as little as two cents added to packaging expense may give the package a sufficient "buy me" appeal to save three cents on overall selling, sales promotion and general advertising costs.

Improvement by about 30 percent in the industry's 1949 safety record was noted by W. M. Aicher, director of the Foundation's public relations department. There were 25 lost-time accidents per million man-hours worked last year, he said. This compared with a rate of 35 such accidents during the previous year. With the Foundation's industry-wide safety program getting well under way, Mr. Aicher predicted even better safety records for the years 1950 and 1951 in the brewing industry. He also reported that per-man productivity was on the upswing. The industry increased its manpower by 23 percent between 1938 and 1949, but the increase between 1947 and 1948 was only 2 percent. This, he thought, was largely due to adjustments made during and since the war when brewing had to struggle along as a non-essential industry.

A three point program to boost sales of beer and ale was recommended by Archibald M. Crossley, president, Crossley, Inc. His points were: 1. The collection of all types of useful marketing data from the census and other sources and offering a service to industry members based upon the data. 2. Mutual interchange within the industry of such types of marketing experience data as would be practical to obtain. 3. Liaison between the brewers of America and the American people so that each could get to know the other better.

Observing that the consumption of malt beverages is nearly two-thirds greater than it was in 1940, Harry M. Stevens, vice-president, J. Walter Thompson Co., New York City, urged the industry to prepare to supply a steadily growing population in an atmosphere increasingly favorable to its products. This educational work must be continuous, he said, in view of growth in population and shifts in various age and family groups.

Show Policy

Another J. Walter Thompson Co. vice-president, John Kuneau, emphasized that no industry can hope to be highly regarded unless its basic policies deserve that regard. But good policies and good actions can win public regard only if the public is informed of them. He offered evidence to show that the Foundation's "Joe March" advertising series, circulated in rural areas, is enjoying highly successful results.

Five key factors to be kept in mind when developing posters were cited by Ellyson S. Robinson, Jr., vice-president, Outdoor Advertising, Inc., San Francisco. 1. A good poster should be recognizable from a distance and easily identified. 2. It should not need subcaptions and secondary illustrations to develop an "appeal and sell" as in other advertising media. It should deliver its message in ten seconds. 3. It should drive home the central theme of the campaign being promoted in other

media. 4. It should have a strong emotional appeal. 5. It should contain an idea that stimulates the interest of the viewer.

Sylvester M. Weaver, Jr., vice-president in charge of television, National Broadcasting Co., noted the increase since 1940 in the average family income. Representing a rise of 21 percent, this increase amounts to over $12,000,000,000. Reporting on a survey of 15 TV-advertised brands and 13 competing non-TV-advertised brands, Mr. Weaver concluded that if a brewer's product had been included in the test, it would have had a 40 percent increase in TV homes. It would also have experienced a $20 increase in sales for every dollar spent in TV. Moreover, he continued, the increase in sales in TV homes would not show any decline no matter how long the family had owned the set.

Charles B. Roth, sales training consultant, urged the brewers to inaugurate sales training programs in order to avoid loss through sales declines. He said there is now a shortage of 2,500,000 adequately trained salesmen in various industries.

Control Outlets

Dean James W. McCarthy, University of Notre Dame, college of domestic and foreign commerce, urged the industry to intensify its program to promote wholesome outlets through education. He indicated that some modification of fair trade practices might be necessary if the brewers are to exert greater control over undesirables in the retail field. "The history of American economic development," he said, "is that sooner or later the industry that does not regulate itself is regulated by some other agency." Unlike most other industries, which have only to consider the customer's attitude, the alcoholic beverage industries must also consider the non-consuming public. Actually there are two jobs to be done, he said: First, the customer must be satisfied, and second, the non-customer must be kept from becoming dissatisfied. Dean McCarthy recommended an industrywide establishment of minimum standards that the retailer must meet if he is to enjoy a brewer's franchise. Recognizing that taverns are licensed by the local community, over which the brewer has no control, he noted that most states have laws prohibiting sales of alcoholic beverages to persons who obviously should not enjoy the privilege. If there are persons who should not be served, he argued, there are also establishments which should not be permitted to sell. To prevent disreputable retailers from taking refuge under the fair trade practice acts, some of these acts might have to be modified, he thought.

Packagers Study New Materials

Spruced up designs for packages also win attention at AMA show featuring plastic advances and equipment

Greatly increased use of plastic materials was apparent from every direction at the American Management Assn. 19th Packaging Conference, held at Navy Pier, Chicago, in late April. The constant battle to bring down packaging costs, the display value of the package, and new packaging materials were also subjects of serious discussion.

H. L. Bergren, assistant general sales manager, Kraft Foods Co., pointed out that his company is engaged in its most ambitious new product program. Two new lines are involved in this undertaking—Natural Cheddar in ½- and 1-lb. packages and pasteurized process cheeses manufactured in sandwich-size slices and marketed in ½-lb. units.

Introduction of these new products, he said, has followed a definite sequence: (1) Top management initiates work on the new line of cheeses, (2) product research is undertaken, (3) teams are organized to take the new item from laboratory stage and adapt it to competitive food marketing, (4) consumer-panel testing gets underway, and (5) sales research carries out market testing.

Egmont Arens, president, Society of Industrial Designers, New York City, stated that processors are taking a new look at their designs, since their packages are distributed in retail stores, which are moving more and more toward self-service selling. Suppliers in the packaging field now offer mouth-watering reproductions of foods on packages—the most powerful selling tools that have ever been available in retail merchandising.

In the opinion of Donald Deskey, Donald Deskey Associates, New York City, one of the most fruitful fields for processor and retailer to increase the effectiveness of packages at the retail level lies in point-of-sales devices acceptable to the increasing number of supermarkets.

O. M. Gale, associate manager, public relations div., Proctor & Gamble Co., suggested that processors: (1) Exercise care in selecting a color and design to give packages high display value, (2) employ display devices to inform the consumer how to use the product to the best advantage, and (3) teach the consumer new uses of the product.

Polyethylene-coated papers, declared L. M. Burgess, H. P. Smith Paper Co., Chicago, come closest to being ideal. At normal temperature, they have excellent water and solvent resistance. Also outstanding are their folding endurance and low temperature flexibility. In addition to listing other important properties, he said that the surface has barely been scratched in the uses of these coated papers. He urged consideration of polyethylene wherever there is a difficult packaging problem.

William Rabak, chemist, Western Regional Research Laboratory, U. S. Dept. of Agriculture, Albany, Calif., stated that modified soft microcrystalline paraffines possess unusual low temperature properties that make them suitable for dip-coating frozen foods like poultry or meats, or for coating packages of frozen foods. These paraffines modified with polyisobutylenes, crepe rubber, and other compounds, are moistureproof, flexible, and tough at low temperatures.

Blending S-Polymers

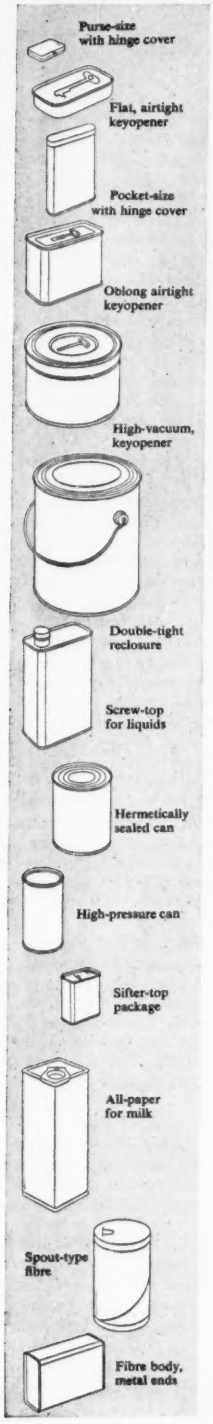
Attainment of greater versatility by blending polyethylene with polyisobutylene (S-polymers) and other packaging applications of the S-polymers was discussed by Raymond G. Newberg, Chemical Div., Standard Oil Development Co., Linden, N. J. It appears possible to fabricate films from selected blends of polyethylene and S-polymers that will be useful in vacuum packaging, particularly where resistance to the penetration of all gases and water vapor is necessary. These films may also be used for packaging dehydrated foods that require selective resistance to such penetration. Another use may be for packaging dried fruits that need SO_2 retention and oxygen exclusion.

Thin self-supporting films readily fabricated from S-polymers have many desirable qualities that are requisite to meet the present trend for packaged products. The excellent resistance of this film to water-vapor penetration is desirable in the preservation of products that must be kept moist and of other products that must remain dry under humid conditions.

S-polymer films, since they have low permeability to oxygen, SO_2, and water vapor, also appear ideal for packaging dried fruits.

Employed with waxes for hot-melt coatings, the polymers raise the melting points of the waxes, tend to stabilize them against breakdown from heat, improve their flexibility, and in some

WHICH PACKAGE SUITS YOUR PRODUCT?



This familiar oblong container comes with either a screw-top or u-press-it fitting. Also available in a variety of sizes with pouring spout, seal closure *and many other types of fittings for consumer convenience.*

Are you considering the consumer when you package liquids?

This container makes friends—keeps 'em!

You know it as the handy can that pours easy, doesn't drip and closes tight.

Advertising experts and sales managers know it as the package that "works with" the label—plenty of space to show your brand in brilliant color.

It now helps sell such products as linseed oil, turpentine, paint and varnish remover, maple syrup, honey.

It could easily do the same robust selling job for liquid detergents, liquid wax or olive oil.

Brass? Silver?

And how about brass or silver polish, glass cleaners?

To sum up, *this container is ideal for many liquids where positive reclosure is essential.*

Don't you think your package-development experts should get together with ours?

Since 1901 Canco has been responsible for just about every important development in the packaging industry—food and non-food products alike—involving an infinite variety of containers that are metal, fibre or a combination of both.

Let Canco help *you* in designing labels, cutting costs, building sales and advising on packaging, processing, filling and closing.

For prompt help in production-line emergencies, and containers in any quantity when you need them, take our advice and *call Canco first!*

AMERICAN CAN CO.
CANCO
NEW YORK
CHICAGO
SAN FRANCISCO
HAMILTON, CANADA

cases lower the permeability to water vapor. High polymer concentrations in waxes have shown considerable promise for cellophane coatings, wax paper laminates, and as adhesives for paper labels that are to be applied on cardboard and on cellophane containers by heat and pressure. Low polymer concentrations in waxes have been successfully used for bread wrappers.

Displays "Pack 'Em In"

Making the rounds of the displays of the 240 exhibitors, over 9,000 visitors at the exposition saw new packages, wider application of plastic films, and high-speed packaging machines designed for a greater variety of uses.

One new item—the laminated collapsible tube—was hailed as meeting the growing demand for food packed in this form. This tube consists of two barriers of aluminum foil and four coatings or sheets of plastic—all heat sealed to form a single wall. Outside plastic sheet is usually reverse-printed before being laminated to the foil—to "trap" the printing between the two materials.

At one exhibit, new sift-proof sacks for powdered foods were being closed by special machinery handling the bags up to 10 lb. at 15 to 30 a minute.

Most striking were the new and varied applications of the plastic films—polyethylene, saran, Pliofilm, cellophane, and cellulose acetate.

Biggest part of the show was devoted to new equipment. Visitors saw the fastest machine of its type—a rotary piston unit filling semi-liquid products at 600 containers a minute. A 28-pocket gravity filler was handling 450 14-oz. bottles of catchup a minute. Also on view was a new unloader that removes glass containers from a shipping case and transfers them into a single file ready for the filling machine.

Seen, too, by the visitors was a new box-making machine designed especially to suppy vari-size corrugated containers required in small amounts. A patented size-selector permits change-overs from one size container to another in a matter of seconds.

Many persons stopped to look at the new machines handling plasties. One wrapped packages with saran film at 40 to 60 a minute. Other machines were packaging and heat sealing foods in polyethylene.

Prepackagers saw lettuce, and similar items, automatically form-wrapped in heat sealable transparent film.

Visitors gazed at a new machine closing 34 to 102 cartons a minute; another that filled and sealed bags in one sequence of operations; new cartoning equipment; a proportioning unit for accurate weighing of free and non-free flowing materials; and novel code-dating machines.

Candy Problems Weighed at Lehigh

Continuous production methods and better use of principal ingredients were outlined at the recent third annual production conference of the Pennsylvania Confectioners' Assn. conducted in cooperation with the Lehigh University Institute of Research at Bethlehem, Pa.

E. T. Oakes, The E. T. Oakes Corp., Islip, N. Y., stated that continuous mixing is widely used in the candy industry for caste white marshmallows, grain marshmallows, and frappes. Continuous-line production of these items results in improved quality, uniformity, and lower costs. And the method has brought much pressure on batch processes.

Claude J. Covert, Vacuum Candy Machine Co., New York City, pointed out that development and standardization of vacuum cooking of hard candies has offered the industry many advantages that are attributed to the lower cooking range required as compared with the open fire method. He went on to include the many advantages of producing chewing candies, cream fondant, and other confections by the vacuum cooking and cooling system.

Cream Cooking

A new continuous vacuum cooking method for making creams was mentioned by Max M. Guggenheim, National Equipment Corp., New York City. A special high quality cream—84 percent sugar and 16 percent glucose—can be produced by cooking the syrup in jacketed kettles to 242 deg. F. and drawing it through a special nozzle into a vacuum chamber, where its temperature is lowered to 115 to 105 deg. F., ready for the beater.

Thomas B. Downey, Kind & Knox Gelatine Co., Camden, N. J., reported that the diverse characteristics of food gelatines can be duplicated with remarkable uniformity by manufacturers to give confectioners a dependable choice of those properties best suited for their particular requirements.

Norman W. Kempf, Walter Baker Chocolate & Cocoa Div., General Foods Corp., Dorchester, Mass., said that interest has been awakened in exerting better control over the tropical processing of cocoa to avoid flavor defects. These defects are becoming the rule instead of the exception in cocoa beans that are now being shipped into this country.

In evaluating the flavor in chocolate, E. W. Meyers, Hershey Chocolate Corp., Hershey, Pa., stated that it is not improbable that some day consumer reaction to a product will be measured by analytical methods. But until such qualities as goodness are defined, a taste panel must be relied upon for the appraisals.

W. Tresper Clark, Rockwood & Co., Brooklyn, N. Y., discussed the technology of cacao in manufacture, covering such steps as storing the beans, cleaning them prior to roasting, breaking and cleaning the beans, grinding, and conching.

L. Russell Cook, Ambrosia Chocolate Co., Milwaukee, listed some important "do's" and "don'ts" in the selection of chocolate coatings. He went on to caution candy makers on these points: Storing coatings so that they can be used to the best advantage, proper melting and tempering methods, careful enrobing technics, efficient cooling of the chocolate-coated candies, and holding the candies under proper storage conditions.

In discussing the chemistry and physical properties of starches, Ralph W. Kerr, George Moffett Research Laboratories, Corn Products Refining Co., Argo, Ill., showed why thin boiling starches made by the hydrolytic process and oxidized starches prepared by the hypochlorite method prove useful in making gum confections.

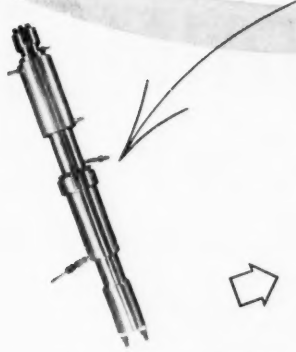
Failure to condition starch for molding candies to a proper uniform moisture content may result in poor mold impressions and irregular shaped items, according to F. H. Brook and D. W. Hanson, A. E. Staley Mfg. Co., Decatur, Ill. Improper conditioning may also require too much time for candies to set and dry in starch molds. Furthermore, a starch crust may form on candies. And they may also become excessively dry and tough. Too much moisture in the starch may cause the candies to sweat.

New Corn Starches

After years of painstaking research, declared John C. Clay, National Starch Products, New York City, the corn wet milling industry has made new starch products available. Natural properties of corn starch have been radically altered in the development of these new products.

R. L. Lloyd, American Maize Products Co., New York City, stated that commercial corn syrups are primarily identified by the degree to which they have been inverted. This identity is indicated by the percentage of reducing sugars present, calculated as dextrose on a dry weight basis and expressed as dextrose equivalent (D.E.). For food processors, there are four types of corn syrup: (1) Low conversion, 24–31 D.E.; (2) standard conversion, 42–45 D.E.; (3) high conversion, 53–55 D.E.; and (4) enzyme conversion, 60–64 D.E.

Another Process Job *where* CLOSE TOLERANCE REQUIREMENTS *Call for Carpenter* Stainless Tubing...

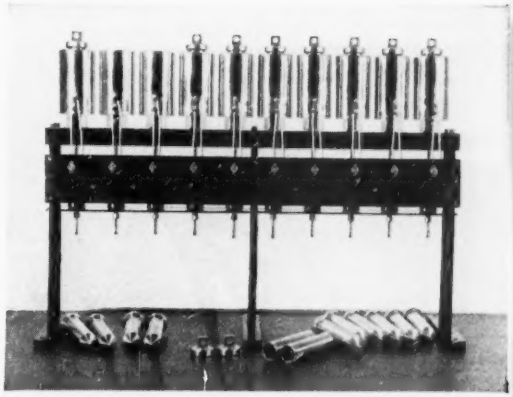


Several sources were tried, but only Carpenter Stainless Tubing meets this company's requirements for close tolerance tube walls.

Used 100% on this job, Carpenter Stainless Tubing is rushed direct from local distributor stocks.

To get more for *your* dollar spent on Stainless Tubing and Pipe, do as this customer did. Call Carpenter and let us work on your problem—whether it's corrosion resistance, close tolerance requirements or rush delivery to keep your equipment on the job.

One telephone call to your Carpenter Stainless Tubing representative or distributor will put our years of experience to work on your problems. THE CARPENTER STEEL COMPANY, ALLOY TUBE DIVISION, 109 Springfield Road, Union, N.J.



Electrically heated fluid content still with removable retorts made from Type 304 Carpenter Stainless Tubing. Close tolerances on ovality and wall thickness are required for accurate operation of the still. All Stainless Tubing in the unit is delivered from local Carpenter distributor stocks.

***RUSH SERVICE** on your orders is an everyday habit with Carpenter Stainless Tubing Distributors.*

Stainless Tubing Data for Quick Reference . . .

A note on your company letterhead will start this handy Carpenter Stainless Tubing File on its way to you. It contains information on physical constants, sizes and shapes, corrosion resistance, etc. Write today for your copy.

Carpenter

STAINLESS TUBING

"MORE THAN CORROSION RESISTANCE"

Whipped Cream sprays out to decorate Cakes and Desserts.

Plastic coating sprays out to preserve woodwork.

Mothproofing Spray protects clothes quickly and easily.

SENSATION OF THE PACKAGING INDUSTRY

CROWN SPRA-TAINER

Lacquer sprayed on Silverware keeps finish bright without polishing.

The Original and Leading Light Weight Propulsion Can has **NO-SIDE-SEAM NO-TOP-SEAM**

Everyone is talking about the new products that spray or come from cans under pressure—Whipped Cream, Plastic Sprays, Insecticides, Deodorants, Air-Conditioners, Perfumes, Colognes and others. But the big point is—most of the cans used are Crown Spra-tainers, for Spra-tainer was the First and is still the Number One light-weight propulsion can. Spra-tainer has no-side-seam—no-top-seam. This is made possible by Crown Can's exclusive patented method of producing *seamless construction.* Spra-tainer holds *more pressure, has less leakage.* If your product is liquid or sprays, find out what Spra-tainer can do for you. Ask to have a Crown Sales Representative call.

Several different Dispensing Valves are Available; but make sure the body is a Spra-tainer. Press the Top and It Sprays!

CROWN CAN

One of America's Largest Can Manufacturers

Plants at Philadelphia, Chicago, Orlando. Branch Offices: New York, Baltimore, Pittsburgh, St. Louis • Division of the Crown Cork & Seal Company

Food Industry News

Ruling in Packer's Labor Case Counter to Wording of T-H

In two agencies of government, pressure has been aimed at Wilson & Co. in regard to its relations with the CIO Packinghouse Workers.

The National Labor Relations Board has decided that the union's strike against Wilson in 1948 did not violate the Taft-Hartley labor law, despite explicit language in the law indicating that it did.

In Congress, Rep. Eugene D. O'Sullivan of Omaha, Neb., introduced a bill that would deny interstate transportation service to all companies that refuse to bargain collectively or engage in any other unfair labor practice. In a statement on the floor, Rep. O'Sullivan admitted that the bill was aimed at Wilson.

The NLRB decision held that, in the absence of a no-strike clause, a union is free to strike during the life of a labor agreement simply by giving 60-day notice under Taft-Hartley. The CIO Packinghouse Workers gave such notice before striking under a wage reopening clause in 1948, midway in a two-year agreement with Wilson.

The labor board favored the union despite the wording of the labor law, which forbids a strike until after 60-days or the expiration of a contract, "whichever is later."

To stick to the letter of this section of the law, the board asserted, would lead to absurd results. The legislative history of the law, the board explained further, indicates that the phrase "whichever is later" was intended to apply only where a 60-day notice overlapped the termination date of the contract.

NLRB has been overruled in the courts before when it has deviated from following the clear language of the law and resorted to its own interpretation of what Congress intended. This could happen again in this case.

The O'Sullivan bill would impose severe penalties on anyone who knowingly transports for firms which, for seven days, refuse to bargain collectively or engage in any other unfair labor practice. Agricultural products at the farm level would be exempt.

Maximum penalty would be a fine of $20,000 and/or imprisonment for five years for every seven days of violation. Referred to the labor committee, the bill is expected to get nowhere.

Recent Annual Reports Show Earnings Drop

Both earnings and total sales appeared on the downgrade in recent annual reports of food companies, though quarterly reports showing early 1950 activities look considerably better.

American Sugar Refining Co.'s annual report was an exception. Net sales of $277,188,249 during 1949 topped 1948's $245,124,382. Net earnings were also up, with $7,950,504 for 1949 against $7,648,360 for the previous year.

Total sales for E. J. Brach & Sons, candy manufacturer, dropped to $31,801,040 in 1949 from the 1948 total of $38,244,457. Earnings were $1,315,405 as against $3,220,209.

Pepsi-Cola Co. revealed a gross profit on sales of $24,102,658 in 1949 compared with $24,990,164 during the preceding year. Net earnings amounted to $2,136,238 in 1949, down from $3,152,817 in 1948.

Libby, McNeill & Libby indicated total sales of $145,306,768 for its 1949 fiscal year, a sizable drop from 1948's $153,574,246. Net income for 1949 dropped to $3,317,977 from $3,809,933 the year before.

Pacific American Fisheries showed a 1949 sales decline to $6,364,640 from the previous year's $9,812,708. Net profit was $631,240 as against $1,748,681 in 1948.

Among the quarterly reports, The Best Foods, Inc., rang up net earnings of $5,018,192 for the first nine months of the 1949-50 fiscal year, compared with $3,925,326 for the same period in the preceding year.

Standard Brands, Inc., also showed a partial year gain, earning $2,142,578 for the first 1950 quarter, compared with $1,786,370 in the 1949 period.

More Strikes, Less Strikers Hit Industry in 1949

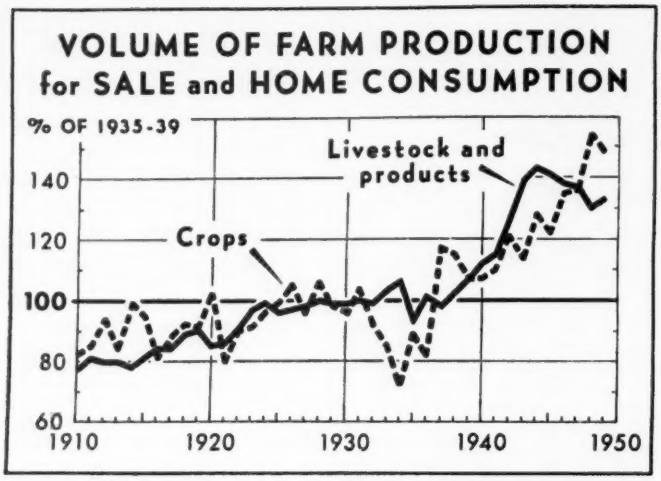
Fewer food plant workers struck last year than in any year since the war. The 50,800 involved in strikes was less than a third of the postwar high in 1946, according to figures released by the Bureau of Labor Statistics.

Oddly, however, there were more strikes in the food industry last year than in 1948, yet only a third as much working time was lost. This suggests that strikes were smaller—both in size and in duration.

The 199 strikes were 37 above 1948. But man-days of idleness added up to only 1,500,000, compared with 4,700,000 in 1948, the postwar peak. The postwar low in strike idleness—648,000 man-days—occurred in 1947.

Trio of Presidents

Man named Harry S. Truman talked over the present and future of the Future Farmers of America with FFA President George Lewis, at a recent meeting in Washington. President John H. Kraft, of Kraft Foods Co. (right), is the national chairman of the committee sponsoring the Future Farmers organization.



Farm Production

This chart can be all the more startling when you consider the steady decline in farm population during the years covered. But the sharply increasing pattern that set in during 1937, appears due for a flattening out. (Wide World)

National Canners Open New Headquarters

The National Canners Assn. dedicated its new $1,000,000 research and administrative headquarters in Washington, on June 8, with executives of the canning and allied industries in attendance from practically every state in the Union. The building, a large 3-story structure for which the ground was broken last May, is at 1133-20th St., N. W.

Funds for the headquarters building and for the construction of another research laboratory in Berkeley, Calif., were raised through assessment on the members of the association, whose membership accounts for about 80 percent of the total canned foods production of the nation. Equipment and supply firms catering to the industry also contributed to the fund.

The National Canners Assn., which has been in existence for 43 yr., is credited with being the first trade association to establish a research laboratory for its members. This took place in 1913 in the present home of the association at 1739 H Street, N. W., the two top floors of which were given over to laboratory work. At last year's ground-breaking ceremonies, Dr. Paul B. Dunbar, Commissioner of Food & Drugs, commended the industry's research activities for their cooperation with the federal government in helping to maintain standards of quality for canned foods at a scientifically high level for consumers.

The new equipment and quarters for scientific research activities will be used in such important work as improvement in processes, development of food standards for the protection of the consumer, development of efficient methods in plant sanitation, and solution of the many technical problems involved in the production of processed foods of highest nutritive value. The laboratories in the new building will consist of bacteriological, chemical, microanalytical, nutrition, sanitation and engineering units.

The building also will house the administrative offices of the National Canners Assn. and other specialized activities.

Dairy Food Consumption Paced By Ice Cream

Per capita consumption of dairy foods in 1949 was 438 lb. compared with 389 in prewar, an increase of 49 lb. or 13 percent. This information was disclosed recently in a special report released by the National Dairy Council, Chicago.

Ice cream consumption jumped from 9 lb. per person in 1935-39 to 15 lb. in 1949, an increase of 67 percent, to lead all other dairy foods on the family table. Cheese followed with a new consumption record of 7.1 lb. per person, an increase of 29 percent. This was 50 percent above the rate of consumption during the 1920's.

Milk and cream consumption per person rose 15 percent in 1949 compared with the five-year period prior to World War II. Butter for cooking and spreads is on the upward swing. It showed a 3 percent gain over the 10 lb. per person consumed in 1948, but the American consumer must eat 6 lb. more butter annually to hit the 16.6 lb. level of consumption in 1935-39. In 1949, dry whole milk usage increased nearly a pound and non-fat or defatted dry milk slightly more than 5 lb. per person over the consumption levels of the same dairy foods in 1935-39.

Milton Hult, president of the National Dairy Council, stated milk production jumped from the prewar mark of 109- to 119,000,000,000 lb. in 1949, an increase of 9 percent. With milk the most widely used dairy food, about half of the milk volume from today's 24,625,000 cows is used for drinking and cooking. The other half is processed into butter, cheese, ice cream and other products ranging from powdered milk to pharmaceuticals. The retail value of this annual output is estimate at $10,000,000,000.

Chemists Hear Report On Bread-Staling Test

Newly developed methods for testing bread staleness and for use of vitamin C to protect flavor and color in frozen fruits were reported by George F. Garnatz, director, Kroger Food Foundation, before a recent meeting of the St. Louis section, American Chemical Society.

Chemists, he said, have devised a machine to measure the freshness of bread—by squeezing it, much as the housewife squeezes a loaf before she buys it.

Freshness is probably the most important factor about bread in the consumer's mind, Mr. Garnatz pointed out, yet the staling of bread is not too well understood by scientists.

"Simply stated, it is generally regarded as involving a physical-chemical deterioration of the starch, which need not necessarily be accompanied by loss of water, but which manifests itself by a progressive firming of the bread," he explained.

Baking chemists have invented several devices which, by measuring crumb compressibility, can determine objectively the staleness and the rate of staling of bread, Mr. Garnatz reported. One such device consists of a disk connected to a platform by means of a vertical shaft.

"A slice of bread is mounted under the disk. With the disk resting on the bread, a magnified scale connected to an electric signal system measures the starting point and then can be set for a standard amount of compression. A flask is then placed on the platform

and mercury is run into the flask at a standard rate. The increasing weight of mercury progressively compresses the bread until the standard compression is reached. Then an electric contact is completed, setting off a signal to the operator to shut off the flow of mercury.

"The weight of the flask and mercury is a measure of the freshness or staleness of the bread, fresh bread compressing under a lesser weight and stale bread requiring greater weight to compress it. The average compression weight from slices covering the length of a given loaf therefore measures the staleness of bread, and when such values are determined daily over a period of time, on loaves from a common lot, the rate of staling is obtained as a linear chart.

"Thus, the baking scientist is able to check on the staling of bread, and the influence of ingredients and processing on this phenomenon, and to use this device in his efforts to further differentiate the mechanism of staling. Already, some modified fats have been found which appear to retard staling by as much as 48 hours."

Preserve Color

The use of vitamin C to protect the color and flavor of frozen fruits and berries was among the other advances reported by Mr. Garnatz, whose topic was "Science and Food." Ordinarily, he explained, frozen fruits and berries become discolored when defrosted in the presence of oxygen, which of course is part of the air we breathe.

Chemists have found, however, that if these fruits and berries are dipped in a solution of vitamin C or are packed in a syrup containing vitamin C before packaging and freezing, their color will be protected against browning, according to Mr. Garnatz, who explained that vitamin C is readily destroyed by oxygen.

"What happens is that the vitamin C on the fruit uses up the air coming

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We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.

The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.

The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.

However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.

You may use this letter in part or in full - for any purpose you care to.

Yours very truly,

BAKER CANNING COMPANY

By Robert Baker

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I-33

Farm Flyer

Designed chiefly for agricultural spraying and dusting, this "slow-flying" Piper Super Cub 105 has taken-off and landed on a rough "pea patch" only 50 yards in length. This take-off required a run of only 80 ft. (Wide World)

in contact with the fruit, so that the oxygen cannot activate certain enzymes in the fruit which, when active, cause browning," he said. "This device is being used increasingly to conserve the color and flavor of frozen fruits and berries."

The meeting was held in the DeSoto Hotel.

Dairy Group Sets Plans For Big Promotion

Market absorption of 7,000,000,000 lb. of surplus milk is the objective of the greatest advertising and merchandising program in the history of dairying, authorized by delegates to the American Dairy Assn. 11th annual rally held in Chicago.

The program is a "do-it-ourselves" business-building reply to Secretary of Agriculture Brannan's challenge to any farmer or farmer group to propose a solution to the agricultural products surplus problem. The adopted program is based on three fundamental principles: (1) A fair return for his products to the producer (2) provision of an adequate food supply to the consuming public, (3) no drain on the public treasury.

Through the observance of these principles, members of the American Dairy Assn. seek a cutting-down of the $12- to $15,000,000,000 of taxpayers' money previously spent to combat the surplus of agricultural products.

This "floating" surplus of 7,000,000,000 lb. of milk represents about 5 percent of U. S. milk production—the loss of a foreign market built up during the war and immediate postwar years. Owen M. Richards, general manager, American Dairy Assn., regards the market absorption of this surplus milk to be a sales job, not a legislative one—a problem to be solved by a market approach, not by making it a political football. His goal for the advertising and merchandising program is the sale of: (1) An extra pint of milk per family per week, (2) an extra quarter-pound of butter, (3) an extra quarter-pound of cheese, (4) an extra pint of ice cream, and (5) an extra can of evaporated milk per month per family.

The cost of the program to the ADA membership for 1951 is to be approximately $3,000,000, at the rate of ¼c. per lb. of butterfat or 1c. per 100 lb. of milk.

Minute Maid Signs Pact To Use Western Citrus

Both divisions of California Fruit Growers Exchange—orange and lemon—have contracted to supply the Minute Maid Corp., New York. The Exchange Orange Products Co., Ontario, will furnish frozen orange juice concentrate and the Exchange Lemon Products Co., Corona, will furnish frozen lemonade mix, newest of the frozen citrus concentrates.

New low-temperature vacuum-evaporating equipment recently installed at Ontario in a $500,000 plant extension will be used to produce the first frozen orange concentrate to be processed by the big citrus cooperative.

At Corona, equipment and space additions costing $30,000 were recently added to the $1,500,000 lemon processing plant. A new canning line was installed and facilities expanded for making frozen concentrate, lemonade base, and single strength lemon juice. Using the same low-temperature, high vacuum process developed by Minute Maid for concentrating orange juice, production of the frozen lemonade mix for national distribution has begun. Over 320,000 boxes of lemons will be processed in 1950, say officials.

BLS Adds Frozen Foods For Price Measuring

For 18 months, frozen foods will be among 110 new food items the Bureau of Labor Statistics will add to the moderate-income urban family's market basket for pricing in measuring month-to-month changes in the Consumers Price Index, commonly called the cost-of-living index.

This will be a trial period, after which BLS will determine what food items should be priced regularly in the 56 large cities. BLS is trying to find out what changes have occurred in family food purchasing since the last changes were made in the 1935-39 period.

The market basket BLS has been pricing since then has included 50 items of cereals and bakery products; meats, poultry and fish; dairy products; eggs; fresh, canned and dried fruits and vegetables; beverages; fats and oils; and sugar and sweets.

For this trial period, BLS is adding to this market basket frozen foods, perishable fruits and vegetables, canned baby foods, prepared flour mixes, beer, wine (even whiskey) and other food products which have become more important in the American diet since the mid-30's. BLS says they represent the most increasingly important food expenditures of moderate-income urban families, as reported in postwar family expenditure surveys of BLS and the USDA's Bureau of Human Nutrition & Home Economics.

Sanitation Foundation Troubles USPHS

Officials of the U. S. Public Health Service fear that the National Sanitation Foundation will take the spotlight from their food sanitation program.

Dissatisfaction with the way the USPHS has been running food sanitation work and possible fear of Oscar Ewing's "welfare state" led to the establishment three years ago of the NSF as a cooperative venture of industry, sanitation officials and university public health authorities. The NSF is supported by industry contributions.

The USPHS sanitation program

has been running into trouble for several years. Its food sanitation program, ably run by Abe W. Fuchs, was absorbed first by a newly-established Division of Sanitation, which in turn became part of another new organization, the Office of Environmental Health Services.

The OEHS is now a part of the Bureau of State Services, a potent political arm of the Public Health Service. The Bureau doles out federal money as "grants" for research. However, no federal grants for food technology and sanitation have been made.

Now the USPHS fears that NSF, which has been given considerable favorable publicity because of the straightforward way it has attacked the environmental sanitation problem, will "take the ball away."

To complicate matters for Hollis and Fuchs, the Public Health Service is no longer an independent agency, but is a part of Oscar Ewing's Federal Security Agency.

The sanitary engineers thus must subordinate industry and public health recommendations to the "welfare of the people." The Hoover Commission has recommended the divorcement of the PHS from the welfare agency and its establishment as an independent medical service unit.

Elevated by McGraw-Hill

S. D. Kirkpatrick, editor of *Chemical Engineering* since 1928, and a vice-president and director of the McGraw-Hill Book Co., has been elevated to the post of editorial director of the publishing company unit that comprises *Chemical Engineering* and FOOD INDUSTRIES. John R. Callaham, executive editor for the past year, becomes the new editor of *Chemical Engineering*.

No stranger to the readers of FI, Sid Kirkpatrick functioned as acting editor during the early years of the publication and, more recently, immediately preceding the appointment of its present editor, F. K. Lawler, in January, 1949.

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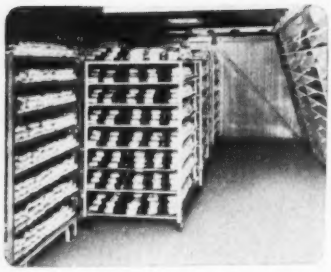

Quick-freezing Corn-on-the-Cob with Frick Refrigeration

The W. E. Bittinger Co. freezes cut sweet corn and corn-on-the-cob, as well as spinach, at its new plant in Hanover, Penna. Its Frick-Freezer handles 30,000 pounds of corn a day; its storages hold 40,000 pounds.

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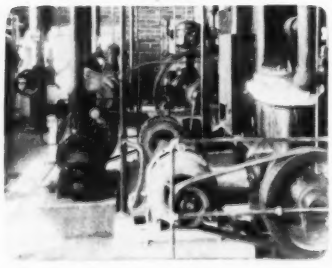

Inspected Pork Products Free From Trichinae

Ready-to-eat pork products as prepared commercially by reputable meat packing companies operating under federal or comparable state or city inspection may be considered to be free from infective trichinae. So reported the American Meat Institute recently, on the basis of research completed by Dept. of Agriculture scientists.

"Extensive tests on federally inspected products," the Institute said, "show that in 1949 only 81/100 of 1 percent of ready-to-eat products containing pork showed evidence of trichinae. Even in this small quantity the microscopic parasites had been effectively destroyed—and the meat consequently was entirely wholesome—by methods prescribed by federal regulations. Included in the ready-to-eat products studied were frankfurters, salami, bologna, thuringer sausage, Canadian style bacon, cooked ham and other products composed wholly or partially of pork muscle tissue which are regularly sold to consumers ready to eat without further cooking."

Maple Syrup Processing Boosts Blend Value

The Bureau of Chemistry has been investigating the problems of the maple-syrup industry and now proposes changes in syrup-making practice.

Clearly evident to bureau investigators is a small static market for pure maple syrup, which sells at a high price but with limited demand because of consumer resistance to the store price. In contrast is a large, and apparently growing but unsatisfied, market for mixed syrup, which is called "maple flavor." This is customarily made from 75 to 80 percent sugar syrup and 20 to 25 percent of a strong-flavor, dark-colored, maple syrup which would not usually qualify for independent sale to discriminating buyers. The present sale of this syrup blend is limited primarily by the limited availability of the dark strong maple syrup component.

Bureau investigators have developed a new boiling technique by which light and medium maple syrup can be converted into a much better dark blending product, with four to six times the flavor strength. The process is simply a heating of the syrup for 2 hr. at 250 deg. F., at an estimated cost of 10c. a gal.

The flavor is intensified but without caramelization or development of non-maple flavors. The blend result is "a full-flavored maple syrup blend that is practically indistinguishable in taste and appearance from the best grades of pure syrup although it costs much less." Use of the new-process syrup is being investigated for ice cream, bakery products, and other processed food.

"Dead" Cheese Production Traced to Penicillin

Reports of cheese manufacturing difficulties increased so sharply last year that the dairy division of the University of Idaho made a special investigation. Complaints were similar whether they originated at the university dairy, in or out of the state, or in other countries. Cheese vats were either completely "dead" or very slow, and they produced poor quality cheese.

Source of the trouble was discovered to be traces of penicillin in the milk from cows being treated for mastitis. It was found that as little as one part of milk taken from a cow 12 hr. after treatment with 200,000 units of penicillin, when mixed with 99 parts of milk from untreated cows, was sufficient to cause serious difficulty in cheese making through destruction of "starter" cultures.

Dairy farmers were therefore advised to withhold from their shipments of market milk the first four milkings from the treated quarter of the cow's udder.

Meantime, the university's bacteriology department is considering the development of lactic acid starters, which are resistant to penicillin, streptomycin, and similar materials. Work will also be done with dyes added to the injection materials as a means of quickly identifying milk from treated cows.

Swift Workers Get Awards For Safety Records

Compiling outstanding safety records throughout the year 1949, employees of 21 meat packing plants operated by Swift & Co. were given awards by Ned H. Dearborn, president of the National Safety Council, in a presentation ceremony at the company's general offices in Chicago.

The 21 plants were participants in the year-long safety contest conducted for the meat packing industry in 1949 by the council. Their awards included 4 first place trophies, 2 second and 2 third place certificates, and 13 achievement certificates. Size of the winning plants varied from large to small and represented all geographical sections of the country.

R. A. Harschnek, Swift safety di-

rector, accepted the awards for the company. He reported that the average accident frequency rate at the 21 plants during the 1949 contest year was 6.0, which means that only 6 lost-time injuries occurred during the year for every 1,000,000 man-hours worked. This was almost 50 percent better than the average frequency rate for all U. S. industrial plants, he explained, and about 65 percent better than the average rate for the meat packing industry alone. The average frequency rate for all Swift plants during 1949 was 9.1.

USDA Says Vegetable Fat Adulterates Ice Cream

In a recent interpretation, the Federal Security Agency states that it regards any frozen product adulterated if it contains vegetable fat in complete or partial substitution for milk fat.

The Food & Drug Administration has received a number of inquiries regarding proposals to market in interstate commerce ice cream containing vegetable fat. Such a frozen product is made and sold in a number of states.

In interstate commerce, such ice cream is considered adulterated within the meaning of the Federal Food, Drug & Cosmetic Act and therefore subject to action under the law.

1960 Farmer?

This could turn out to be a glimpse of what the properly dressed farmer of the future will wear. A lab assistant at the Georgia Experiment Station uses Plexiglas bin and hopper to distribute radioactive phosphorus mixed with other component parts of fertilizer. Tests are being made to determine how much fertilizer a plant will use, how close to place it, and when it should be placed.

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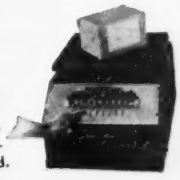

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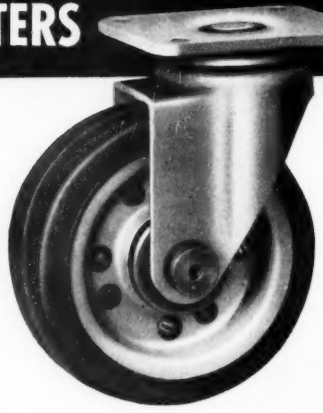

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Natural Deep Freeze

Processing, freezing and marketing his product right on the spot, this dealer in Aomori, Japan, prepares a "big one" for the next customer. No deep freeze refrigerator is needed, for ice covers the area almost constantly from September to April. (Wide World)

Three Fairmont Plants Shift to Birds Eye

The Birds Eye-Snider Division of General Foods has taken over three packing plants formerly owned by Fairmont Canning Co. Inc. The new units are located in Waseca, Mapleton and Madelia, in the heart of Minnesota's top-quality vegetable growing area. The plants will be used chiefly for the processing of Birds Eye quick-frozen peas. Operations will start in June.

The three Minnesota plants will be part of Birds Eye-Snider's eastern production division with John Seaman having direct supervision. M. G. LaRowe, district production manager will head up production at all three plants. E. P. Byron, former Fairmont manager, will be plant manager for Waseca and Mapleton, and H. A. Lindsey will manage the Madelia plant.

Plans Laid to Produce Canned Liquid Milk

International Milk Processors, Inc., Chicago, has been formed to design plants, provide equipment, and render technical service for the canning of liquid milk.

First plant is to be built in East Stanwood, Wash., to supply Alaskan markets. Process follows that under experimental development by John H. Stambough, dairy farmer, Valpariso, Ind., and Roy R. Graves, formerly with the U. S. Dept. of Agriculture.

A marketing company known as Med-O-Milk, Inc., has been formed by a group of Washington and Alaskan dairy and business men and will operate under license from International Milk Processors, Inc. The plan is to market canned liquid milk in a manner similar to that now followed with canned fruit juices and soups.

Food Industry Costs Up But Public Isn't Told

The food industry has done a poor job of presenting its side of the food cost situation to the consumer, said Nathan Cummings, board chairman of Consolidated Grocers Corp. during a recent Los Angeles visit. The industry has failed to show the public how labor costs, processing, transportation, and distribution go into the price of food over and above the amount paid farmers for produce.

The result of this failure to tell the public the facts of low-cost, high-quality food, Cummings told a meeting of the Food Industries Sales Managers Club, has been "discriminatory legislation, unfavorable public opinion, and hostility to the industry's best efforts in catering to the public."

"We must make it clear" he said, "that the food industry has not made big profits."

Frozen Fish Grading Offered in Bill

A bill providing for the voluntary grading, inspection and certification of frozen fish has been introduced in the House by Clark Thompson, Democrat of Texas. Thompson is chairman of the House Sub-Committee on Fisheries.

Under provisions of the bill, the Fish & Wildlife Service would be authorized "to inspect, certify and identify the class, quality, quantity, and condition of frozen fishery products when shipped or received in interstate commerce" under rules prescribed by the Secretary of the Interior. The federal government would collect fees to cover the cost of the service. "Fishery products" includes all fish, crustacea, mollusks, and all other aquatic forms of animal and vegetable life.

The bill is so broad that it will be found in conflict with U. S. Public Health Service authority for inspection and certification of shellfish. So far, the USPHS has withheld comment. The National Fisheries Institute says that it is quite probable that Thompson and his committee will not be in a position to judge the workability of the proposal until a full hearing is held.

this Bulletin •••

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Move boxes — cartons — crates — sacks and bundles from basement to first floor, or any floor to floor, or convey in a straight line — continuously with the Standard UTILITY BELT-VEYOR. A compact, pre-engineered unit, easy to install (over existing stairways where practical) handles commodities up to 150 lbs. — available in 4 belt widths — 10, 14, 20 and 24 inch — and equipped with adjustable guard rails to facilitate handling packages wider than belt. Electric motor operated. Write for Bulletin FI-60.
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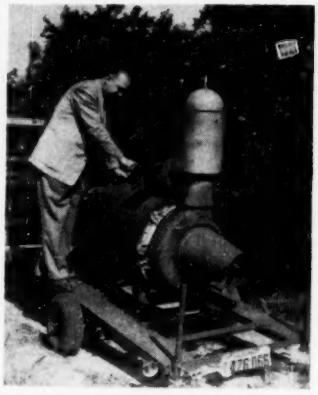


Turbojet Smudge Pot

Well, maybe it isn't a smudge pot, but its designer says it will replace 500 of the orchard heaters. Edward West, Jr., shown here with his new turbojet unit, says it will warm 10 acres of orchard on 30 gal. of diesel fuel. (Wide World)

Poultry Import Permits Will Be Required

Permits will soon be required for importing live poultry and eggs from countries other than Canada and Mexico, according to proposed amendments of Bureau of Animal Industry. This will be accomplished by adding poultry to the list of other animals that are already restricted by BAI regulations, including ruminants, swine, and equines.

This added precautionary measure against introduction of new poultry diseases, not now in the United States, came by coincidence just at the time of an Asiatic Newcastle disease outbreak following the import of some Chinese game birds into California.

The proposed amendment was published on p. 2108 of the April 14 *Federal Register*. Written comments were to be received until April 29. Promulgation of the revised regulation was expected during May.

Canned Baby Food Output Seen Holding Gains

Canned baby food production should not decline over the next five years, in proportion to downward trend in the birthrate, according to the industry report issued by the Dept. of Commerce. The 1949 pack of 122,000,000 cases was 4,500,000 cases under the 1948 output. Likewise the count of infants under two years of age, which hit a peak of 7,400,000 in 1948, began to slide last year.

However, the report notes, population increase has been only part of the story in the baby food industry's expansion. In 15 years, annual production has expanded 30-fold. And this growth has been due to industry's own efforts in developing and expanding both its products and its markets. With a large number of young mothers still to be won to full acceptance of canned baby foods, constantly higher nutritional standards to be met, and more diversified foods to be produced, the industry should continue its gains at least through the next five years.

There is an additional market, the report points out, among elderly persons and those requiring special diets, that is far from being fully tapped.

"Poly" Bread Packaging

Use of polyethylene film for packaging of bread and other bakery goods has been made practical by rapid developments in this field according to a recent report. Industry packaging men see reduced delivery costs and a virtual end of lower prices for second-day goods.

Because of the film's moisture retention properties, delivery of bakery products at three or four day intervals, with little or no loss in quality, will be feasible.

During the past year, polyethylene production has increased from a rate of 15,000,000 lb. per yr. to a rate in excess of 50,000,000 lb.

Desert Grapes

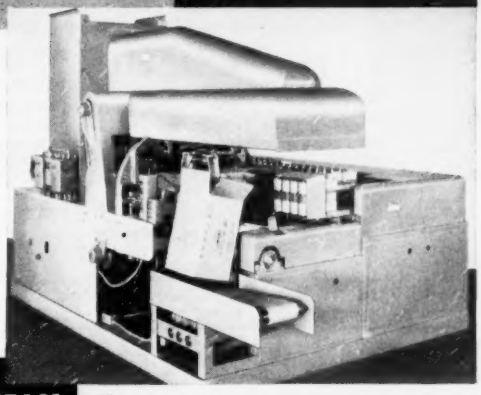
For all we know, the gal here may have thought there was a swimming pool in the vicinity of this former desert valley. An underground watershed of apparently limitless proportions promises the first crop of Thompson seedless grapes ever grown in the U. S. (Wide World)

Now by PACKOMATIC

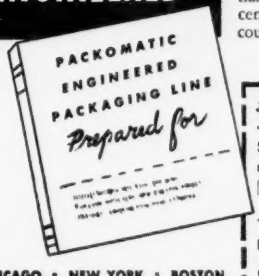
Paper Shipping Cases Opened, Filled and Sealed . . . Automatically

PACKOMATIC automatic shipping case loader with gluer-sealer, (*above*), takes round or rectangular packages, assemblies and loads them into previously squared and registered end-opening shipping cases.

PACKOMATIC fully-automatic shipping case opener-loader, (*right*), forms containers and positions them for receiving assembled packages, then discharges cases, ready for gluer-sealer.



COMPLETELY AUTOMATIC PACKAGING production line to loading dock PACKOMATIC ENGINEERED



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Additional PACKOMATIC equipment includes carton forming and filling machines; volumetric fillers, paper tube equipment and a variety of shipping case gluers and sealers. PACKOMATIC speeds America's great brand names to market. PACKOMATIC's quarter-century experience is yours for the asking. Use coupon below; no obligation!

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Send information about automatic cartoning machinery ☐ shipping case loading ☐ sealing ☐ imprinting machinery ☐ for ..... *

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enables three men
to do work of ten
● A conveyor system, using Cyclone Flat Wire Metal Conveyor Belt, sharply reduced labor costs at an East Coast fishery. The conveyor speeded up washing of fish prior to fast freezing and enabled three men to do work that previously required ten men.
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Packaging brussels sprouts for freezing —Santa Cruz, California.

One of America's biggest processors of unquestioned reputation has just been through an embarrassing predicament . . . delivering short weight packages and worse still be told so by two of their large customers. Here is what happened: (1) Carelessness in checking filling machines; (2) relying upon cartons to take product to required weights; (3) no systematic checkweighing of finished packages. This situation was corrected by control measures in the form of EXACT WEIGHT Scales where needed and alert operators to make things click once again. Don't risk loss of business in your plant.

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USDA Grade Standards

Recent actions by Production & Marketing Administration of U. S. Dept. of Agriculture on U. S. Grade Standards and related activities include the following:

Canned spinach, second revision, p. 2034, April 11 *Federal Register*, effective May 12.

Frozen broccoli, first revision, proposed, p. 2219, April 20 *Federal Register*.

Poultry-rabbit prerequisites to grading and inspection, proposed, p. 1914, April 5 *Federal Register*.

Poultry official identification and inspection marks, new, p. 2075, April 13 *Federal Register*, effective April 13.

Husked corn on the cob, new, p. 2033, April 11 *Federal Register*, effective May 11.

Beans (dry threshed field and garden beans, whole, broken, and split, of 22 different classes besides miscellaneous and mixed beans), revised, p. 2175, April 18 *Federal Register*, effective May 1.

F&DA Food Standards

Status of food standards actions by Food & Drug Administration at the beginning of May showed several important developments.

Canned mushrooms hearing in April to amend the present standards lasted a little longer than expected. After six days' discussion of the addition of ascorbic acid as an optional ingredient and the possible elimination of citric acid, which is already a permitted optional ingredient, the hearing was recessed until mid-May so that French and Italian canners would have opportunity to get additional data into the record. Although there was difference of opinion among American canners as to the desirability of ascorbic and citric acids, there was little objection to the proposed standards of fill of container.

Residue tolerances hearing continued with chemical manufacturers scheduled to testify during most of May. A very thorough review of fungicide requirements was presented during the latter part of April by the American Phytopathological Society. Review of toxicity of insecticides and fungicides will begin in Part D of the hearing, following a recess, expected about June 1.

Canned corn tentative order for standards of identity, quality, and fill of container, appeared on p. 2060 of the Apr. 12 *Federal Register*. Originally, written exceptions to the tentative order could be filed until May 2. However, this date was extended to June 5 by the Federal Security Ad-

Just a Shot of MSG

Long used to accentuate the flavor of meat in cooking, monosodium glutamate is here injected into the carcass of a chicken just after slaughter. Eugene Ellis, Red Crest Poultry, Opa Locka, Fla., is showing an operator how to do the job most effectively.

---

ministrator, granting the request of National Canners Assn.

Canned pineapple and *canned pineapple juice* hearing has been postponed to Oct. 15, 1951, at the request of Pineapple Research Inst. of Hawaii.

Bread standards of identity await a tentative order. This is not expected until mid-summer or later, although rumors of earlier promulgation occasionally appear.

Frozen fruit tentative order has been long awaited.

Salad dressings and *cheeses* final orders were still awaited in early May.

Preserves may be the subject of a hearing in the late summer or fall. A 1942 request from the National Preservers Assn. has been renewed, and the Administrator has promised a hearing as soon as practicable. Reduction of corn syrup limits and elimination of label declaration are the principal features expected from the hearing.

"Oleomargarine" labeling was covered by a statement of general policy by Food & Drug Administration published on p. 2081 of the Apr. 13 *Federal Register*. This was apparently necessary to clarify the new section numbered 407 added to the Federal Food, Drug, & Cosmetic Act by Public Law 459, 81st Congress.

Ice cream containing vegetable fats in partial or complete substitution for milk fat was the subject of another F&DA statement of general policy on p. 2082 of the Apr. 13 *Federal Register*. F&DA regards "a frozen product made in semblance of ice cream, but containing vegetable fats in com-

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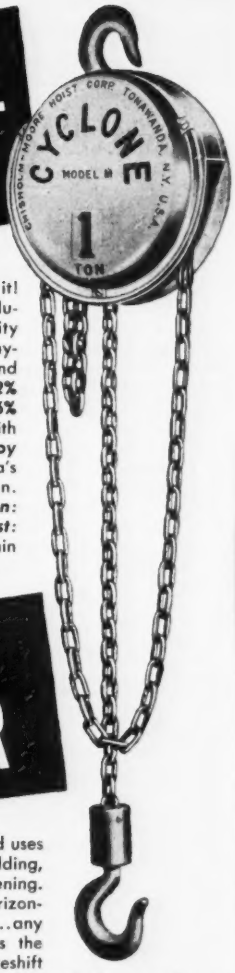

There's nothing to compare with it! ***63% Less Weight:*** Of Alcoa Aluminum Alloy, the 1 ton capacity weighs only 35 lbs. Carry it anywhere with ease. Designed to stand the "gaff" of maintenance work. ***42% Fewer Parts:*** Long service life. ***96% Efficient:*** Lifts loads rapidly with easier pull on the chain. ***Herc-Alloy Flexible Load Chain:*** America's first welded alloy steel chain. ***Sealed-in Lifetime Lubrication:*** No attention required. ***Low Cost:*** No more than heavy old style chain hoists. Capacities: ¼ to 10 tons.

CM PULLER

LIFTS OR PULLS AT ANY ANGLE

The tool of a thousand uses for lifting, pulling, skidding, stretching, straightening. Use it vertically, horizontally, diagonally... any angle. Eliminates the dangers of makeshift methods. Holds the load where you leave it. Compact, light weight... the ¾ ton capacity model weighs only 13 pounds. Herc-Alloy flexible load chain. Labor saved more than repays initial low cost. Capacities: ¾, 1½, 3 and 6 tons.

YOUR LOCAL CM DISTRIBUTOR carries the CM Cyclone and the CM Puller in stock. Phone him for a demonstration in your plant.

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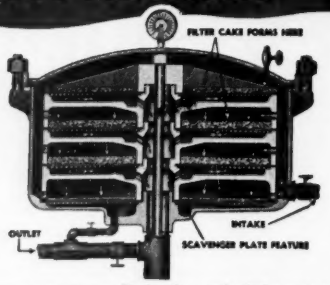
SPARKLER horizontal plate FILTERS

Capacities 50 G.P.H. to 5000 G.P.H.



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Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

Filters water sparkling clear, removes all off-tastes, odors, color, sediment, chlorine, sulphur, algae, pipe rust, etc.

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always with gravity. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

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Wherever cleanliness is a factor . . . in cleaning fruits and vegetables, in the manufacture of biscuits, crackers, bread, candy and cheese . . . *sanitary, Suprene Belting is always in demand!* That's because it's so easy to keep clean! . . . washes like new with steam or hot water.

A superior cotton duck belt, Neoprene impregnated, it is highly resistant to the corrosive action of fats, greases and fruit acids. Odorless, tasteless and waterproof, Suprene Belting offers years of safe and sanitary conveyance. Available in a variety of plies and four styles to meet all your food handling requirements. Send for Bulletin 20.

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plete or partial substitution for milk fat . . . as adulterated within the meaning of the Federal Food, Drug, & Cosmetic Act." Although it is said to be in production in several states for intra-state distribution, this new Food & Drug interpretation is likely to discourage interstate marketing of such a product.

Tea standards are prepared and submitted by the Board of Tea Experts for official promulgation each year. The current standards cover the period May 1, 1950, to Apr. 30, 1951, including eight teas: Formosa Oolong, Congou, India, Formosa Black (to be used for Formosa and Japan Blacks), Japan Green, Gunpowder, Scented Canton, and Canton Oolong. Also published in this Apr. 13 *Federal Register* (p. 2083) was an amendment in the tolerances for dust and siftings in all teas. May 13 was set as the effective date for this amendment.

Schedule of Events

June

1–2—American Society of Quality Control, 4th annual convention; Auditorium, Milwaukee.
4–7—American Society of Refrigerating Engineers, 37th spring meeting; Hotel Muehlebach, Kansas City.
5–8—National Confectioners Assn., 67th annual convention, and 24th industry exposition; Waldorf-Astoria and Grand Central Palace, New York City.
6—American Assn. of Candy Technologists, 2nd annual meeting; Waldorf-Astoria, New York City.
12–30—Massachusetts Institute of Technology, 3-week course in Food Technology; Cambridge.
20–22—American Dairy Science Assn., 45th annual meeting; Cornell University, Ithaca, N. Y.
29–July 1—Grocery Manufacturers of America, mid-year meeting; The Greenbrier, White Sulphur Springs, W. Va.

August

7–9—International Apple Assn., 56th annual convention; Statler Hotel, Washington, D. C.
7–19—First International Trade Fair; Coliseum International Amphitheater and Navy Pier, Chicago.
14–25—University of Colorado, short course in statistical quality control; College of Engineering, Boulder, Col.

September

5–9—American Chemical Society, Chicago Section, 6th national chemical exposition; Coliseum, Chicago.
10–13—National Frozen Food Locker Assn. and Frozen Food Locker Institute, joint convention; Palmer House, Chicago.

—End

Does your product have this advantage?

Calcium and phosphorus enrichment is an important selling feature—one which lends itself to aggressive promotion of your product. Many food manufacturers recognize the health advantages of calcium and phosphorus enrichment—building sound teeth and strong bones. They've discovered that the demand for enriched foods is increasing rapidly.

Victor dicalcium phosphate is used extensively for mineral enrichment of cereals, flour, baby foods, candy, and many other packaged foods. This important enrichment material offers not only a ready supply of calcium but provides phosphorus as well, in the proper ratio for assimilation.

Victor dicalcium phosphate is a white, tasteless, odorless, finely-powdered material which complies with all Food and Drug Laws.

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DICALCIUM PHOSPHATE, U.S.P.

Hydrated—$CaHPO_4 \cdot 2H_2O$

Typical Analysis:

Phosphorus	18.0%
Calcium	23.6%
pH (50% suspension)	6.8—7.5

Available in 80 lb. paper bags.

DICALCIUM PHOSPHATE

Anhydrous—$CaHPO_4$

Same high purity as hydrated material. It contains no water of crystallization and offers a more concentrated source of calcium and phosphorus.

Typical Analysis:

Phosphorus	22.3%
Calcium	29.0%
pH (50% suspension)	6.8—7.5

Available in 100 lb. paper bags.

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Technical and engineering services, to help you apply new methods, new products and new procedures in your production. On-the-spot studies can be made by highly skilled technical men ...no obligation to you. Just write Technical Service Department.

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Changes in Food Supplies

Stocks

CANNED FRUITS & VEGETABLES in canners' hands April 1, compared with same date a year ago, were reported as follows by National Canners Assn:

	Actual Cases (000 Omitted)	
	1949	1950
Peas	8,149	4,678
Corn	9,930	14,695
Beans (green and wax)	1,519	4,023
Tomatoes	6,015	4,614
Tomato juice	10,893	8,061
Tomato catchup	8,745	4,687
Chili sauce	1,766	935
Pumpkin and squash	1,149	193
Red pitted cherries	152	432
	(Basis 24/2½'s)	
Pears	1,398	1,576
Peaches	5,721	6,806
Sweet cherries	119	489
Apricots	2,152	954
	(Dozens)	
Baby Food	50,744	49,735

Production

CREAMERY BUTTER output for March was estimated at 121,750,000 lb., an 8 percent gain from a year earlier and 19 percent above the 1944-48 average for the month. The February-March advance—computed on a daily basis—was 12 percent, as against 10 percent in 1949 and 8 percent for the five-year average.

AMERICAN CHEESE production in March, estimated at 70,010,000 lb., was 1 percent under March 1949, but 12 percent above the five-year average for the month. Seasonal advance was 18 percent, on a daily basis, compared with a gain of only 10 percent a year earlier and a five-year average upturn of 15 percent.

ICE CREAM produced in March reached an estimated 38,285,000 gal., 7 percent less than March 1949 and 2 percent under the five-year average for the month. On a daily basis, seasonal production advanced only 4 percent, compared with an increase of 16 percent in 1949 and an average February-March rise of 18 percent.

MARGARINE production totaled 90,040,000 lb. in March, which compares with 79,841,000 lb. for March 1949 and 64,453,000 lb. for the 1945-49 March average. Output in February was 77,453,000 lb.

POULTRY canned or used in canning during March held close to average. Total of 12,936,000 lb. compares with 10,342,000 lb. produced in March 1949 and with 12,525,000 lb. in the 1944-48 average for the month.

FROZEN EGG production in March was 20 percent larger than during the same 1949 month. Total output was 77,924,000 lb., compared with 64,721,000 lb. for March 1949.

DRIED EGGS produced in March totaled 10,082,000 lb., as against 14,310,000 for the same month last year.

CHICKS hatched during March, estimated at 265,092,000, were slightly above the 263,667,000 hatched during March 1949 and the 1944-48 average of 259,440,000.

Storage

FROZEN FISH & SHELLFISH held in storage April 1 totaled 86,946,988 lb., compared with 104,346,374 lb. held a month earlier. Holdings on April 1, 1949 totaled 82,722,384 lb.

PUBLIC COOLER occupancy fell 1 point during March, standing at 54 percent on April 1. Although 6 points below average for the date, occupancy was, nevertheless, 6 points above the same 1949 date.

FREEZER occupancy dropped 4 points during March, being at 70 percent on April 1. This compares with average April 1 occupancy of 73 percent and with last year's 64 percent.

Indexes

The commodity index on foods, compiled by the *New York Journal of Commerce*, stood at 180.3 for the week ending May 13, which compares with 179.1 for the previous week; 173.9 for April; and 185.6 for May, 1949.

Business Week's index of business activity held at 205.7 for the week ending May 6. The previous week it was 206.5; a month earlier, 202.0; and a year earlier, 189.4.

CONSTRUCTION

	Pending (thousands)	Total Awarded May (thousands)	Total Awarded 1950 (thousands)
Bakery	$1,025	$200	$3,682
Beverages	.....	400	5,880
Canning and Preserving	.....	.....	400
Cold Storage	.....	.....	464
Confectionery	.....	.....	368
Grain Mill Products	2,054	593	11,951
Ice, Manufactured	.....	.....	70
Meats and Meat Products	915	.....	2,091
Milk Products	75	128	2,794
Miscellaneous	100	568	15,795
	$4,169	$1,889	$44,095

A Cambridge Balanced Belt whisks frankfurters and bacon through the packaging operation. Open mesh and stainless steel construction permits caustic or steam cleaning and meets all sanitary requirements.

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WIRE BELTS

Cambridge Wire Belts are efficient workers in your field. They serve in heat, cold, corrosive and wet processes; through packaging and assembly operations—moving quickly or slowly at constant or varying speeds. Wherever a material can be processed during movement, a Cambridge belt can, and does, save time, money and floor space.

Cambridge offers you a modern engineering staff with experience in your field and skilled workmen to produce the right belt in the correct mesh and weave, metal or alloy to perform your operation better . . . for longer.

Consult your Cambridge representative—look under "Belting, Mechanical" in your Classified Telephone Directory or write direct.

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Wire cloth in rolls. Also specialized wire fabrications

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Here's economical standardization on your 125 lb. bronze valve requirements

IN THIS LINE OF VALVES you'll find just what you need to take care of your requirements for 125 lb. service. And you'll also get the inherent values that go into the design and manufacture of every Lunkenheimer product . . . the finest of materials, metallurgically tested and approved; sound engineering design; perfect alignment of parts; meticulous accuracy; craftsmanship guaranteed by skill and ripe experience; the most modern equipment to produce better, and ever better products.

It is the balanced combination of all these factors that has made Lunkenheimer the synonym of highest valve quality, and your guarantee of lowest valve cost per dollar invested.

Give any Lunkenheimer valve a chance to prove itself in service. Once installed, it will quickly demonstrate real economy. Its performance, under all conditions, will be a firm recommendation for your complete standardization on Lunkenheimer . . . and the solution of your valve problems.

Want more information on these fine 125 lb. valves? Ask your distributor for Circulars 566 and 582—or write us direct.

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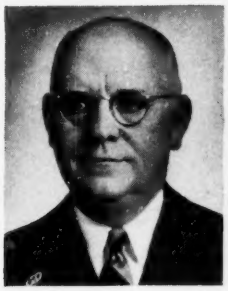
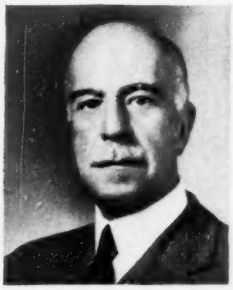
Your Lunkenheimer Distributor

is stocking these 125 lb. S. P. Bronze Valves. Call upon him for your original equipment, replacement and repair valve requirements.

Men, Jobs, Companies



LEONARD E. HURTZ has been named chairman of the board of Fairmont Foods Co., Omaha, Neb., after serving as president for 10 yr. A past director of National Assn. of Manufacturers, he is active in the dairy and ice cream fields.



F. T. BEDFORD, president of Penick & Ford, Ltd., Inc., since 1926, was recently elected chairman of the board. J. Max Widmer, with company for 30 yr. and most recently executive vice-president, succeeds him as president.

JAMES W. EVANS assumes direction of the research laboratories of American Maize-Products Co., Roby, Ind. He was formerly head of the food and carbohydrate section of General Mills, research department. (Fabian Bachrach photo)

CHARLES W. KAUFMAN has been named to succeed the late Thomas M. Rector as head of the General Foods Corp. Dept. of Research & Development. He will assume all responsibilities held by his predecessor, who died on March 31.

Industry

Airline Foods Corp., Linden, N. J., has purchased the Wheeler-Barnes Co. of Minneapolis, manufacturer of preserves, jellies, canned and maple syrups, molasses, peanut butter, mustard, and bakery jellies. Wholesalers can expect savings as a result of pooled shipments.

American Soc. of Bakery Engineers has elected Don F. Copell, Wagner Baking Co., president; Earl E. Cox, Helms Bakery, Inc., first vice-president; Charles Riley, Brolite, second vice-president; and Victor E. Marx, American Dry Milk Inst., secretary-treasurer.

Anheuser-Busch, Inc., recently broke ground on its new $20,000,000 brewery in Newark, N. J. The plant will be equipped for production of 1,200,000 bbl. of beer annually. Operation is scheduled for summer of 1951.

Brand Names Foundation has named Donald B. Douglas, vice-president of the Quaker Oats Co., as chairman of its board of directors. Paul S. Willis, president of Grocery Manufacturers of America, was designated to serve as industry representative.

Coble Dairy Products plans construction of a $150,000 milk processing plant at Columbia, S. C.

Falstaff Brewing Corp., St. Louis, will construct a new $1,000,000 general office and warehouse in St. Louis.

Fisheries Council of Canada has chosen J. H. MacKichan as its new president. R. Bell-Irving, A. S. Barbour, T. G. Smallacombe, H. W. Welch, A. T. Goodridge, and L. T. Blais, were elected regional vice-presidents.

Igleheart Bros. Div., General Foods Corp. has begun construction of a grain storage facility in Evansville, Ill. Capacity: 2,000,000 bu.

Kraft Foods Co. is constructing a modern Cheddar cheese factory at Fayetteville, Tenn. New plant is expected to be completed for late spring operation.

Santa Rosa Canning Co., Harlingen, Tex., has taken over the Mercedes, Tex., plant of Rio Foods, Inc. Addition of improved equipment enables pineapple to be handled at 500 to 750 cases per hour.

Steve's Potato Chips, Beckley, W. Va., has received a federal-state award of merit for its efforts in providing jobs for physically handicapped persons. The certificate was signed on behalf of President Truman by Adm. Ross McIntyre.

G. S. Suppiger Co., St. Louis, has bought Sardik Food Products Corp.'s canning factory at Shirley, Ind. Catchup and tomato juice will be packed, with operations scheduled for this season.

Welch Grape Juice has purchased the Yakima, Wash., plant and facilities of Hyland-Stanford Corp. Thus, company grape juice shipments from the East to the Pacific Coast will be eliminated.

Personnel

R. M. Budd has been appointed to the newly created position of general advertising manager for Campbell Soup Co. He will supervise advertising for the complete line of company's products.

Deronda Burt, formerly general manager of Pennbrook Milk Co., Philadelphia, has been promoted to position of executive vice-president. He will be in complete charge of company operations.

John Derst, Jr., has been elected treasurer of Derst Baking Co., Savannah, Ga.

Alex S. Graydon has been appointed executive assistant to the vice-president and general manager of John Labatt, Ltd., Montreal.

Edgar A. Jett, formerly assistant director of Armour Research Foundation, Chicago, is now a vice-president of the Nutrine Candy Co.

B. H. King, until recently associated with Macon Frozen Foods, Inc., is new manager of Houston Frozen Products Corp., Perry, Ga.

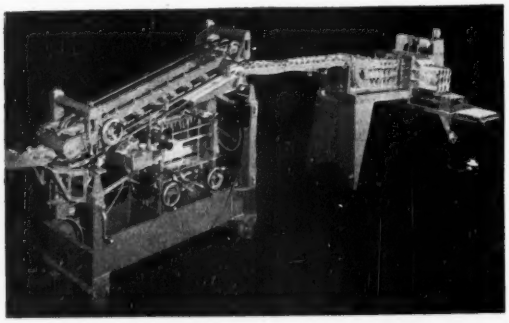
Alfred E. Leighton has resigned as

The Most Economical Equipment Made For

LABELING & CASING

Engineered By CRCO-New Way

Eliminate man-hours wherever possible in your handling and warehousing operations. Mechanize your operations! Take full advantage of specialized CRCO-New Way equipment to secure a continuous even flow with a minimum of man-hours. CRCO-New Way handling equipment is engineered to meet all conditions without delays.



CRCO-New Way Model E Heavy-Duty Labelers have a high-level discharge, thus permitting gravity feed into a roll-in Caser, eliminating the need for a booster elevator in the line. A high-speed, precision-built machine, fully adjustable for tin or glass containers. Available if desired to handle long-neck bottles, cans with bale ears or jugs with handles. Wrap-around or spot labels. Continuous label feed if desired.

CRCO-New Way Casers are conceded to be the most rugged, trouble-free and speediest available . . . the only casers built with right or left and also two-side discharge for even higher production. In several models including the Model A or gravity roll-in type, the Model AA for larger sizes of containers, and the Model B for high-speed, two-tier filling.

Write for complete details and prices.

THE BEST OF Everything

CHISHOLM-RYDER CO. INC.

Niagara Falls, New York

FOR THE FOOD PROCESSOR

Chisholm-Ryder Company of Pennsylvania AN AFFILIATE

Ayars Machine Company A SUBSIDIARY

318

J. L. (LARRY) HEID has left the Florida Citrus Canners Cooperative to become manager of Golden Citrus Juices, Inc., Fullerton, Calif. He was instrumental in developing the frozen concentrated citrus juice process and in helping his former organization receive the "Food Industries" 1949 Award for Progress.

chief chemist and candy technologist for Sweets Co. of America, Hoboken, N. J. He had been with company 7 yr.

John A. Moe, product manager of American Home Foods, Inc., since January, 1949, has been promoted to post of manager of Mid-Atlantic region. Richard E. Moller, Boston district manager since 1947, has been named manager of Eastern region.

Paul P. Payne is the new president and general manager of Purity Baking Co., Charleston, W. Va. With firm since 1920, he succeeds William F. Grady.

John Schmidt, vice-president and comptroller of Armour & Co., Chicago, was elected secretary to succeed Edward L. Lalumier, retired. A. H. Van Kanpen was named assistant secretary.

Stuart Seelye has been elected vice-president in charge of sales for Louisiana Coca-Cola Bottling Co., New Orleans. He had been sales manager for 26 yr.

John R. Troth, graduate of Wahl-Henius Institute and member of Master Brewers Assn. of America, is now brewmaster of Gipps Brewing Corp., Peoria, Ill.

Associated Industry

Dairy Industries Supply Assn. elected K. L. Wallace, Walker-Wallace, Ltd., Toronto, as its new president at the

This is News!

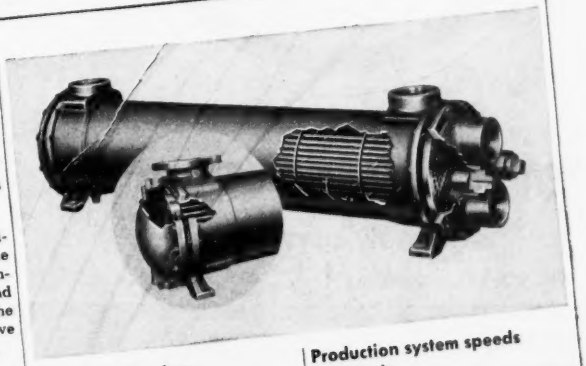
NEW LOW PRICES OPEN WAY FOR WIDE USE OF ALL-CUPROUS REMOVABLE BUNDLE EXCHANGERS

Redesign and Mass Production Set Costs Lower Than Many Iron and Steel Shell Units

BUFFALO, N. Y.—Extensive redesign of the Ross Type BCP Exchanger, famed for its service on U. S. Navy combat vessels, opens the way for industry-wide use, announces Ross Heater & Mfg. Co.

New, low prices now make an all-copper and copper alloy, removable tube bundle unit available at a considerable saving over cast iron and steel shell units, especially in the smaller sizes, and at competitive costs in many of the larger sizes.

These developments are predicted to have an extremely favorable effect, of far reaching proportions, on both original equipment manufacturers furnishing exchangers as accessories, and industries utilizing exchangers in their own plants.



Boasts larger transfer surface in same size unit

Full standardization and quantity production, bringing about the new, low prices, were not the sole objectives and results of the redesign, Ross points out. Sharing the limelight is the substantial increase in heat transfer surface.

In many instances, a smaller, less expensive Ross Type BCP now serves the same conditions that formerly required a larger, costlier exchanger of conventional design. Passages between tube bundle and shell, that normally remain unused, are filled with an extra ring of tubes in the new Type BCP. By thus eliminating a short circuit of fluid around effective tube surface, and by introducing an improved close tolerance baffle system, Ross has achieved better fluid distribution, hence increased transfer surface. Tubes, even though there are now more of them, have not decreased in size.

Production system speeds shipments

Typically Ross-standardized and Ross-quantity-produced, components and sub-assemblies of Type BCP Exchangers are being carried in stock. Quick assembly to standard or individualized specifications, therefore enables quick shipments.

Offers informative, new literature

Now ready for distribution is a colorful new bulletin (No. 2.2K1) describing and illustrating in detail the design features of the new Ross Type BCP. Copies will be forwarded without charge to anyone requesting on company letterhead.

ROSS

ROSS HEATER & MFG. COMPANY, INC.

Division of American Radiator & Standard Sanitary Corporation

1443 West Ave. **Buffalo 13, N. Y.**

In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

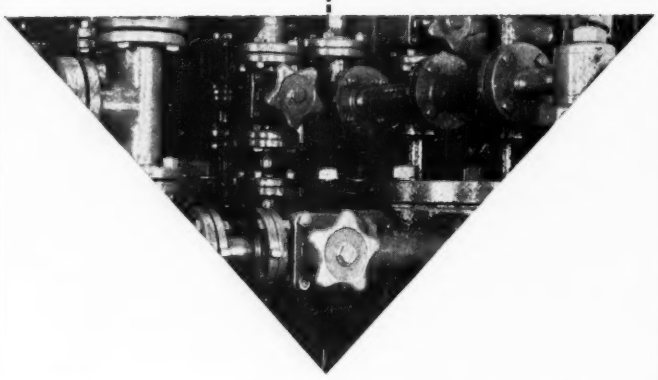
Serving home and industry

AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

SARAN
LINED
steel
pipe

means dependable protection

against corrosion!



For the dependable protection against corrosion that assures you of long-term operation at a minimum maintenance cost—*specify saran lined steel pipe.* Saran's unusual resistance to most chemicals and solvents plays an important part in the reduction of shutdowns and lost production. Another noteworthy advantage is its ease of field fabrication—involving NO costly delays with special tools or handling. Saran lined steel pipe is available in maximum lengths of 10 feet and in sizes from 1 to 6 inches. Also available are saran lined diaphragm valves, plug valves, flanges, reducing flanges, flanged fittings, gaskets and fittings with union ends. Manufactured by The Dow Chemical Company, Bay City, Michigan, distributed by Saran Lined Pipe Company, Dept. TSP-33.

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Saran Lined Pipe Company

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SARAN LINED PIPE
a
DOW
product

KURT BECKER, brewing technologist and director of research for the Siebel Institute of Technology, Chicago, has received the Cincinnati Achievement Award for 1950. Established in 1935 by the Cincinnati District, Master Brewers Assn. of America, the presentation is in recognition of contributions to advancement of the brewing industry and outstanding service.

31st annual meeting in Chicago. Also R. D. Britton, Wisner Mfg. Co. was elected vice-president and Ralph L. Young, Sharples Corp., was renamed treasurer.

Eriez Mfg. Co., Erie, Pa., has been appointed distributor for RCA's electronic metal detectors. These devices will discover any metal embodied in materials being processed.

Foster Wheeler Corp., New York, has elected Vice-Adm. Earle W. Mills president and chairman of board.

Fairbanks, Morse & Co. has elected Robert H. Morse, Jr., its new president. He succeeds his father, who becomes chairman of board.

Lee Rubber & Tire Corp., Youngstown, Ohio, has named O. S. Dillison vice-president. E. N. Ikirt has been appointed general manager of Republic Rubber Div., a subsidiary.

Marathon Corp., Chicago, has named William L. Keady as its new president.

Owens-Illinois Glass Co. has named Edward A. Randlett as its Western Region closure and fastenings sales manager.

Refrigeration Equipment Manufacturing Assn. has elected R. H. Israel, Virginia Smelting Co., president. He succeeds K. D. Thorndike.

Artist – Narciso Dobal, native of Puerto Rico

PUERTO RICO — *annual purchases: $535 million — mostly packaged.*

CONTAINER CORPORATION OF AMERICA

CLARK in the FOOD Industry

A SURE-FIRE WAY TO GET MORE FOR YOUR MONEY—CLARK FORK TRUCKS

✓More Efficiency
(DO MORE JOBS BETTER)

✓More Economy
(COST LESS TO OPERATE)

✓More Durability
(LAST LONGER)

CLARK products are released only after standing the exacting test of Clark's Unmatched Engineering Laboratory.

Lower your break-even point—by cutting those handling costs with the versatile, efficient, and economical Clark Machines

Many practical handling attachments broaden the usefulness of Clark fork trucks—good idea to know about them

To borrow the new movie—"Handling Groceries the Certified Way" fill in coupon, attach it to your business letterhead and mail to CLARK

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INDUSTRIAL TRUCK DIVISION • **CLARK EQUIPMENT COMPANY** • BATTLE CREEK 14, MICH.

We would like to make arrangements to borrow the movie "Handling Groceries the Certified Way."

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AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

GEORGE E. WALLIS, president of Creamery Package Mfg. Co., Chicago, was presented an honorary plaque for his outstanding contributions both to the Dairy Industries Supply Assn. and to the entire dairy industry. Through the years, only two others have been so honored—John H. Mulholland and Ralph L. Young.

United Board & Carton Corp. has elected T. M. Loddengaard president. He succeeds Fred Enders, who has become chairman of board.

Wagner Electric Corp., St. Louis, recently advanced T. E. Postlethwaite to the post of chairman of board. J. H. Devor succeeds him as president.

Worthington Pump & Machinery Corp., Harrison, N. J., has named Walther Feldmann vice-president in charge of sales. He was formerly president of Electric Machinery Mfg. Co., a subsidiary.

Deaths

N. Luther Bagwell, Sr., 67, founder and president of Bagwell Preserving Co.—Mar. 23 in Nashville, Tenn.

Alphonso Gioia, 69, president and founder of Alphonso Gioia & Sons, Inc., maker of macaroni products—Mar. 22 in Rochester, N. Y.

John L. Kellogg, 66, former president of Kellogg Co., Battle Creek, Mich.—in San Diego, Calif., of a cerebral hemorrhage.

E. K. Quigg, 64, president of American Bakers Assn. and secretary-treasurer of White Baking Co., Dayton, Ohio—Mar. 31 in Miami, Fla.

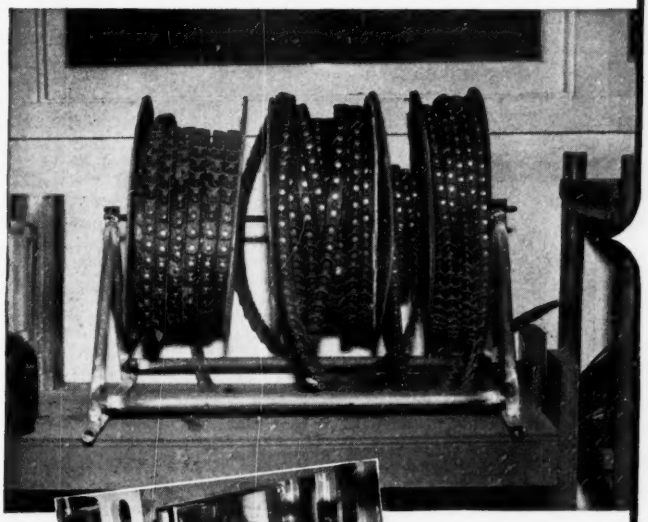
David K. Summers, 50, president of Golden Kernel Pecan Co., Cameron, S. C.—during March, victim of an auto accident. —*End*

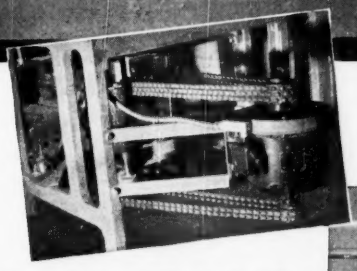
THESE 4 REELS OF VEELOS ARE

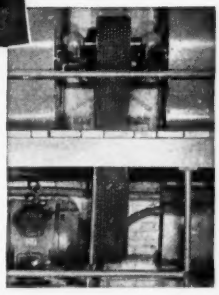
all the v-belt stock

ONE BIG PLANT REQUIRES

1 REEL OF A • 1 REEL OF B • 2 REELS OF C







These drives have been operating for 10 months with Veelos—and still going strong. Endless belt life was 3 months. Veelos installation time was 1 man-hour; endless belt installation time was 30 man-hours. This is one of 12 identical Veelos-driven machines in this plant.

Installation time for Veelos was 1 man-hour—for endless v-belts it was 24 man-hours. These belts have been operating 3½ years. This plant has 3 other Veelos-driven machines exactly like this one.

Before this plant switched to Veelos its stockroom was cluttered with a heavy inventory of different sizes of endless v-belts. This conglomeration of v-belts was expensive to maintain and hard to control.

Now—the story is different! Just 4 reels of Veelos—the adjustable v-belt—take care of 75 v-belt drives in this plant. When the change-over program is completed, all 200 drives will be Veelos equipped!

Naturally enough this plant did not standardize on Veelos without good reasons . . .

- *It saves money* on v-belt inventory—on control of inventory and on storing v-belts.
- *It saves money* when belts are replaced. On one typical installation, a belt change-over that took 30 man-hours—now takes 1 man-hour.
- *It saves money* because Veelos lasts longer—records show they last up to twice as long as endless v-belts.
- *It saves money* because Veelos gives full, vibrationless, power delivery—uniform tension is easily maintained on all belts.

You, too, can *save money*, *boost efficiency*, and *simplify your inventory* by switching to Veelos—the adjustable v-belt.

Have you the facts at your fingertips? Send for your copy of the Veelos Data Book.

MANHEIM MANUFACTURING & BELTING COMPANY
MANHEIM, PA.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof and static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. Veelos is known as VEELINK outside the United States.

"Good Package Design and Protection are Partners in Sales"

Says

WALTER LANDOR

Leading West Coast Industrial Designer

Good package design involves the materials that go into a package, as well as outer appearance. Eye appeal can stimulate the first sale, but if the product has not been properly protected on its way to the consumer, repeat sales may be lost.

Check the sales leaders in field after field and you will find well-protected packages . . . and over and over again, you will find a Riegel paper inside. Many other Riegel papers are designed for flexible packages, for laminates, for outer wraps and for almost every requirement in protective packaging . . . papers that can be relied on for smooth performance on modern high-speed machines.

Tell us your needs, and we believe we can offer you a paper that will do your job . . . efficiently and economically.

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Books

Statistical Sampling Procedures Are Made Easy to Follow

QUALITY CONTROL AND STATISTICAL METHODS. *By Edward M. Schreck. Published by Reinhold Publishing Co., 330 W. 42nd St., New York 18, N. Y., 1950. 213 pages; 6¼x9¼ in.; cloth. Price,* $5.

With cost factors plaguing every food manufacturer—and most other manufacturers, for that matter—the quality/cost ratio is certainly one that will be getting more and more attention. And uniformity of quality is certainly an important factor in this ratio.

The author of this clearly written volume defines statistical methods as the most effective means of dealing with inexactness. He attempts to present the most generally useful modern technics of quality control through statistical methods as applied to industry in general. And because these methods have been highly valuable in food processing, the book should hold particular interest for the food technologist.

For those not well grounded on these methods, the book will be especially useful. It clearly draws each step in the procedure, interpreting the statistics and explaining where and how to look for conditions that tend to throw the operation out of gear.

Illustrations and practical examples reveal startling improvements, not only in quality uniformity but also in reduction of line losses through waste and re-work items.

The author is a member of the staff of the Refrigeration Quality Control Division, General Electric Co., Erie, Pa.

Nutritional Data

BRIDGES' FOOD AND BEVERAGE ANALYSIS *3d Edition. By Marjorie R. Mattice. Published by Lea & Febiger, Washington Square, Philadelphia,* 1950. 412 *pages;* 6¼ x 9½ *in.; composition. Price,* $5.50.

If you are looking for data on food analysis from the nutritional standpoint, here is your meat.

This third edition differs considerably from its predecessors. New chapters have been added and old ones eliminated. Coverage on vitamins has been enlarged, and other portions have been rearranged to reflect altered points of view.

One area where the food producer will find particular interest is in the consideration given to the effect of processing upon nutritive values. But mostly you will be exposed to comprehensive tables—61 of them, covering pages and pages.

Food and Drug Guide

FEDERAL FOOD, DRUG & COSMETIC ACT, 1938–1949. *By Vincent A. Kleinfeld and Charles Wesley Dunn. Published by Commerce Clearing House, 214 N. Michigan Ave., Chicago* 1, 1950. 895 *pages;* 6¾ x 10 *in.; cloth. Price,* $17.50.

After 12 years of the Food, Drug & Cosmetic Act of 1938, the authors here respond to the great need for a useful guide and source book for the production executive as well as for the attorney.

The work tries to be neither a text nor a mere compilation. Actually, it has three parts, of which the middle portion on trade correspondence is the largest. In this middle section is contained the policy statements and interpretations that have been issued by F&DA since 1938.

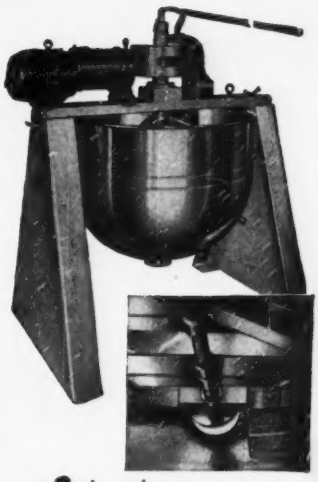
All court opinions pertaining to the Act are covered in another portion of the book, while a third section attempts to furnish exhaustive references to pertinent material for any problem that might arise under any section of the Act.

Pickling Text

CUCUMBERS FOR PICKLES. *By Albert A. Banadyga. Published by National Pickle Packers Assn., 1012 No. Boulevard, Oak Park, Ill.,* 1949. 276 *pages;* 6¼ x 9¼ *in.; cloth. Price,* $3.

Here is both a review and text on the cucumber pickling industry. Abstracts of all available literature on the subject were made, then compiled and summarized. Greater portion of the book is taken up with this summary, which covers cultural practices, diseases, insects, flower ratios, physiology, breeding and geneties, and varieties.

The work is the result of a literature survey made under an industrial



POP the valve open . . .
POP the valve shut . . .
and this agitator keeps mixing all the while . . . DOUBLE MOTION!
(Valve diameter up to 6")

It's the newest in kettles . . .

The HAMILTON
Roto-Speed "MIX-COOKER"!

We believe it to be the finest steam-jacketed kettle for products which tend to settle or choke up. Cooks fast. Mixes thoroughly. Empties fast and clean. Operates at a touch. We'd like to tell you all about this "MIX-COOKER" for "problem products." Users are happy!

Write for complete Hamilton Kettle Catalog

HAMILTON
COPPER & BRASS WORKS, INC.
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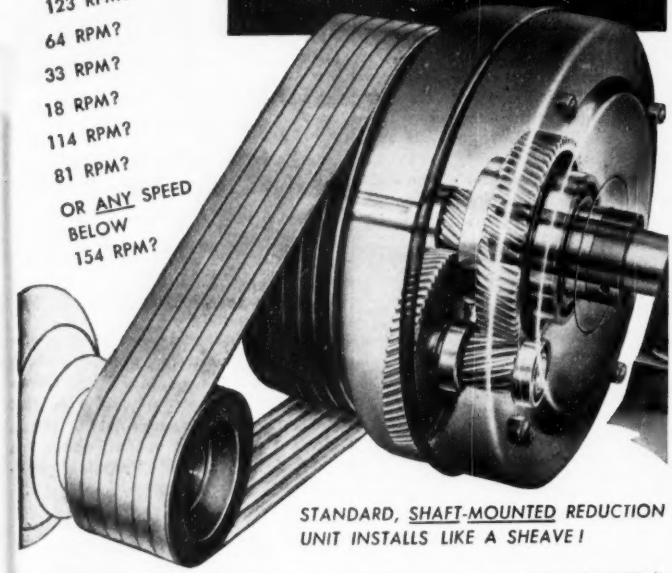
one of the
ALVIN HOCK INDUSTRIES

Which slow speed do you need?

98 RPM?
46 RPM?
103 RPM?
12 RPM?
152 RPM?
74 RPM?
16 RPM?
11 RPM?
123 RPM?
64 RPM?
33 RPM?
18 RPM?
114 RPM?
81 RPM?
OR ANY SPEED BELOW 154 RPM?

WITH THIS One AMERICAN REDUCTION DRIVE YOU CAN GET THEM All!



STANDARD, SHAFT-MOUNTED REDUCTION UNIT INSTALLS LIKE A SHEAVE!

Quick easy speed changes—No need to dismantle heavy gear equipment—*Standard* V-belt sheaves make the change a matter of minutes!

Maintenance reduced—*Standard* V-belts absorb shock, protect equipment and motors from starting and shock loads!

Flexible—Easy to relocate—and you can use *any* specification motor, *any* speed, *any* age!

AMERICAN REDUCTION DRIVES

MAIL TODAY! *The American Pulley Company*
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At no obligation, send me complete information on American Reduction Drives.

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fellowship established at North Carolina State College in 1947, by the National Pickle Packers Assn. The bibliography—included in the book—covers a total of 1141 references on production and on factors influencing varital performance of pickling cucumbers, which were cataloged and reviewed during the survey.

Government Publications

FOOD-YEAST PRODUCTION FROM WOOD-PROCESSING BYPRODUCTS. *By E. E. Harris. Forest Products Laboratory, Madison 5, Wis., Report No. D1754. Mimeographed.* Summary of test methods and results.

PERMANENT GLASS COLOR STANDARDS FOR MAPLE SYRUP. *By B. A. Brice, et al. Bureau of Agricultural and Industrial Chemistry, AIC-260. Mimeographed.*

FORMULAS FOR THE COMMERCIAL USE OF WHEY IN BAKERY GOODS. *By L. V. Rogers. Bureau of Dairy Industry, BDIM-Inf-89. Mimeographed.*

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the Bureau responsible for its issue.

WORLD TRADE DEVELOPMENTS IN 1948 IN SELECTED COUNTRIES. *U. S. Department of Commerce. Price 70 cents.*

Series of seventeen articles on postwar foreign trade of the United States and other leading trading countries of the world—reprinted from the Foreign Commerce Weekly, with revisions and supplementary tables.

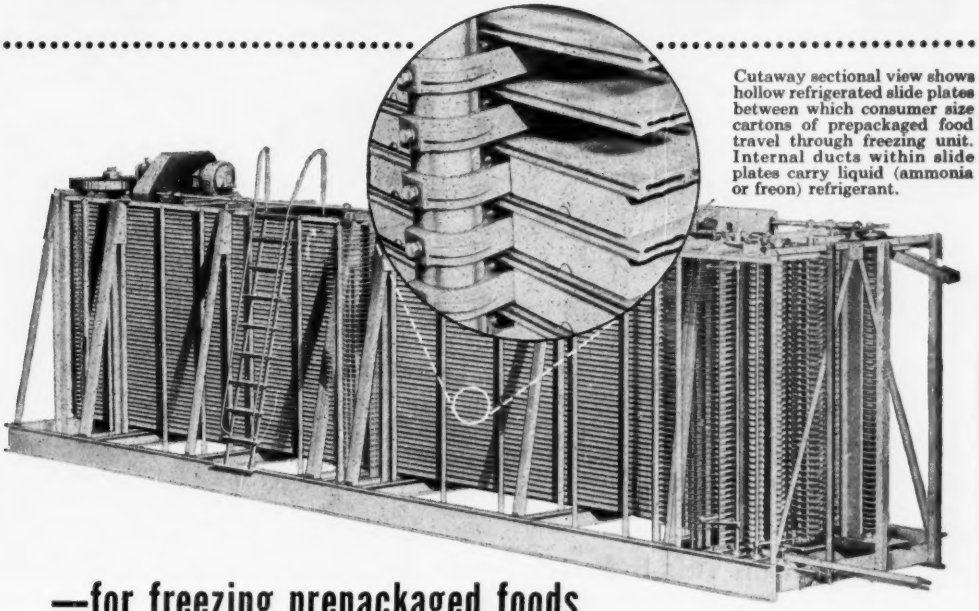
ANIMAL AND VEGETABLE FATS AND OILS, 1944-1948. *Bureau of the Census, Facts for Industry Series M17-1-08. Mimeographed.* Customary 5-year summary of data on production and factory use.

CONTAINERS IN COMMON USE FOR FRESH FRUITS AND VEGETABLES. *U. S. Department of Agriculture, Farmers' Bulletin No. 2013.* Popular for housewife use.

ANIMAL AND VEGETABLE FATS AND OILS, 1944-1948. *Bureau of the Census, Facts for Industry Series M17-1-08. Mimeographed.* The statistical summary for 1944-48 giving factory production, consumption, and stocks, with some data on raw materials, imports, and exports. —*End*

fmc CONTINUOUS FREEZER

Employs sliding contact freezing principle

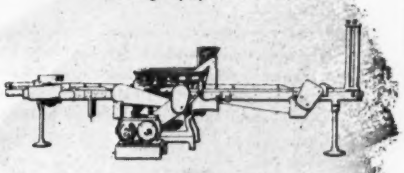


Cutaway sectional view shows hollow refrigerated slide plates between which consumer size cartons of prepackaged food travel through freezing unit. Internal ducts within slide plates carry liquid (ammonia or freon) refrigerant.

—for freezing prepackaged foods

FMC automatic, continuous Freezer accomplishes rapid freezing of prepackaged food up to 100 consumer size cartons a minute. This amazing production-line process is made possible by an exclusive FMC sliding contact freezing principle. Excellent heat transfer and resultant high freezing rates are achieved. Confined freezing of dense, solid packed foods results in maintaining excellence of product quality, flavor and appearance. Neat uniform packages permit tight overwrapping after freezing, insuring moisture proof protection. The FMC method of fully automatic quick freezing requires less space, less refrigeration.

FMC CARTON set-up, filling and closing equipment



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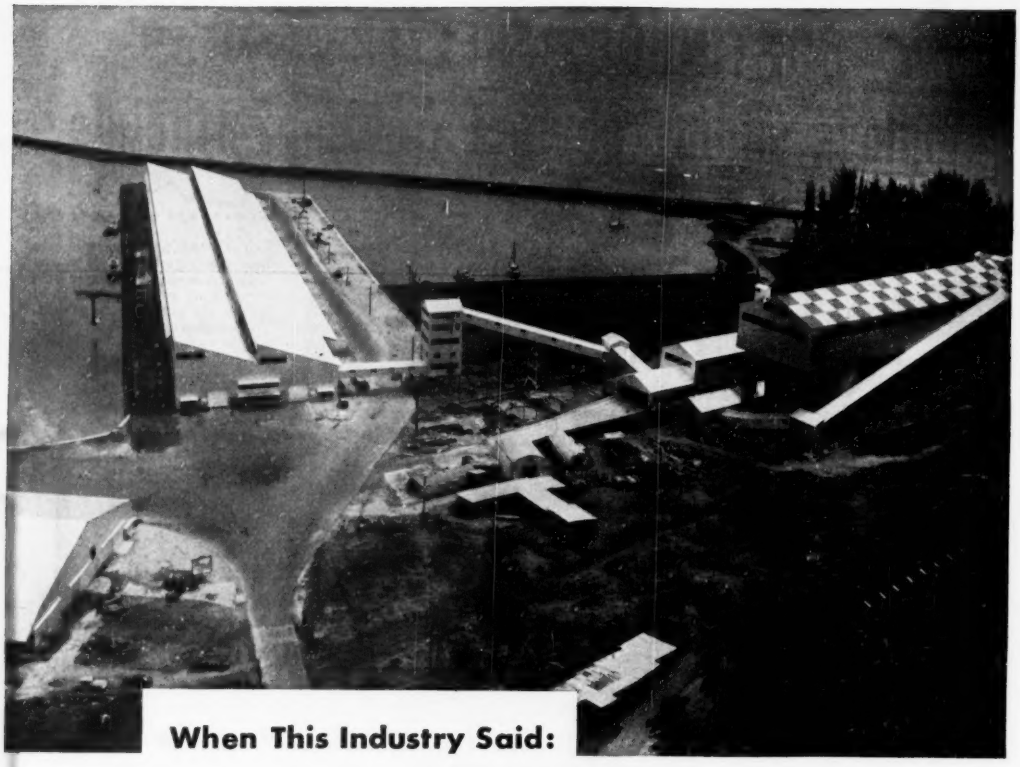

When This Industry Said:

"PASS THE SUGAR"

It Meant 10 Tons a Minute

At this first step in sugar's journey to the American dinner table, volume dictated the requirements which S-A engineers had to meet. Four silos holding 40,000 tons must receive truck loads from the sugar plantations on the island of Hawaii for accumulation until ships arrive. Then, in minimum time, and with fullest use of cargo space the ships must be loaded and on their way. Handling the raw sugar in bulk was clearly the most economical method . . . hence a fast, convenient S-A belt conveyor system.

This installation is a typical example of how Stephens-Adamson engineers find the best answer to every detail of bulk materials handling problems. The S-A line includes *every* type of bulk conveyor unit. S-A engineers can draw on almost 50 years experience in making recommendations for a conveying system to fit your needs—to do the most work at the lowest cost per ton.

If you plan a new conveying system, or to improve your present equipment, put it up to S-A engineers for their recommendations. You're not obligated. Write today!

THE HAWAIIAN CANE SUGAR INDUSTRY, HILO, HAWAII

Raw bulk sugar, hauled by trucks from plantations, is dumped, weighed, sampled and transferred to a S-A belt conveyor system which elevates it to the top of storage silos, discharging to any one designated at 600 tons an hour. Sugar reclaimed from storage silos is conveyed to a tower, re-weighed and re-sampled. A dual system of 36" wide belt conveyors delivers it to travelling gantries on the dock. Swinging boom conveyor and spouts —plus S-A boat-trimming centrifugal throwers on spouts—place sugar in the far corners of holds for maximum storage.

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Food Plant Equipment

Vacuum Rotary Dryers A

For fast drying at low temperatures with recovery of solvents, 24-page Bulletin 341 recommends rotary dryers. Schematic drawings showing details of drying process are featured.—*Buflovak Equipment Div., Blaw-Knox Co., Buffalo, N. Y.*

High-Speed Synchronous Generators B

Dealing with high-speed synchronous generators for standby, portable, and prime source power, 8-page Bulletin GEA-5415 gives construction features, mechanical modifications, and performance data. Ratings from 12½ to 1,250 kva., and speeds from 1,800 to 514 rpm. are covered.—*General Electric Co., Schenectady 5, N. Y.*

Centrifugal Pumps C

Open impeller ball bearing centrifugal pumps are detailed in 8-page Bulletin 5520A. New units are well adapted to irrigation service and low head industrial applications where liquid pumped may carry suspended material. Selection tables are included.—*Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5.*

Continuous Coffee-Roaster D

Rapid roasting at low temperature is feature of continuous coffee roaster set forth in 8-page Bulletin 21R1. Roasting period is reported reduced 70 percent, temperature 40 percent, with this installation.—*Jabez Burns & Son, Inc., 11 Ave. & 43 St., New York 18.*

Plate Heat Exchangers E

Multi-pass plate heat exchangers are discussed in 8-page Bulletin E-916. Highlighted are a graphical illustration of high-temperature, short-time pasteurizer, and a section of plates opened to show flow pattern.—*Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7.*

Permanent Magnetic Separators F

Four-page Bulletin M-3-A describes triple and single air-gap magnetic separators, magnetic grates for hopper bottoms and floor openings, and portable separators for conveyor belts and picking tables.—*Bauer Bros. Co., Springfield, Ohio.*

Hot Water Storage Heaters G

Heating and storage capacity tables for copper-silicon and copper lined hot water storage heaters are given in 4-page bulletin. Lining is stated to insure pure, rust-free water.—*Patterson-Kelley Co., Inc., E. Stroudsburg, Pa.*

Small-Motor Selector H

Various types of small motors, ' ther with complete data on hp. range, s · , torque, reversibility, bearings, mountings, .d applications, are presented in 4-page Booklet B-3075-C. Data facilitates selection of proper fractional hp. unit.—*Westinghouse Electric Corp., Pittsburgh 30.*

Evaporating Condensers I

Forced-draft cooling towers and efficient surface condensers are combined in one unit in evaporative condensers described in 8-page Bulletin 234-E. Units are designed for ammonia and Freon-12 refrigerating systems.—*Frick Co., Waynesboro, Pa.*

Water Clarifiers and Softeners J

Design and operation of cold process softeners and water clarifiers, called reactivators, are set forth in 12-page Bulletin WC103. Comparison with other methods of water purification is also given.—*Graver Water Conditioning Co., 216 W. 14 St., New York 11.*

Indirect Heating System K

Dowtherm is utilized in new indirect heating system treated in 32-page booklet. First half is devoted to processes using Dowtherm, including diagrammatic sketches. Second half describes various heating systems.—*Foster Wheeler Corp., 165 Broadway, New York 6.*

Regulating Valves and Master Controls L

Low pressure regulating valves for controlling gases and liquids according to temperature and pressure requirements are depicted in 12-page Bulletin S-22-C. Pressure master controls and valve accessories are indicated.—*The Swartwout Co., 18511 Euclid Ave., Cleveland.*

Magnetic Starters and Contactors M

Engineering data and selection table for magnetic starters and contactors are reported in 4-page Specification Sheet 856. Dimensioned sketch is also included.—*Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia 44.*

Twin-Shell Blender N

Mixing times of dry solids processed in twin-shell blender are revealed in 4-page Catalog 401. Dimensions and operating characteristics of two blender models are given.—*Patterson-Kelley Co., Inc., E. Stroudsburg, Pa.*

Submersible Pumps O

Capacities and characteristics of motor driven submersible pumps are outlined in 12-page list designated as CE3. Pumps are designed for handling cold, clean water for industrial processing and cooling.—*Sumo Pumps Ltd., Lighthouse Works, Smethwick, England.*

Swivel Pipe Couplings P

Low pressure ball bearing swivel pipe couplings are particularized in Catalog 50. Sizes range from ¼ to 12 in., with pressures up to 12,000 psi.—*Gil-Lair Products, Inc., 81 Masonic Court, Pasadena, Calif.*

Sedimentation and Sludge Units Q

Engineering data, specifications, capacity tables, and detailed diagrams of three different types of circular collectors are contained in 16-page Bulletin 4906. They are designed for industrial waste treatment, sewage treatment, and water purification.—*Ralph B. Carter Co., Atlantic St., Hackensack, N. J.*

Actuating Cylinders R

Ratings, limitations, dimensions, and weights of recently announced medium duty line of pneumatic and hydraulic actuating cylinders

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Imported from France
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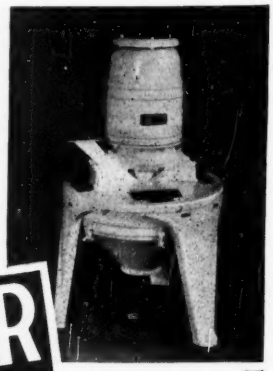

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are outlined in 12-page Bulletin 500. Same data is also included on heavy and super duty lines.—*Ledeen Mfg. Co., 1600 S. San Pedro St., Los Angeles 15.*

Centrifugal Separators A

Complete line of helico-centrifugal separators for removing unwanted elements from steam, air, and other vapors are covered in 12-page Bulletin S-14-C.—*The Swartwout Co., 18511 Euclid Ave., Cleveland 12.*

Steam Plant Equipment B

Line of steam plant equipment, including blow-off valves, liquid gages, level indicators, expansion joints, steam traps, and spray nozzles, are illustrated in 12-page Bulletin G-1307. Specifications are also given.—*Yarnall-Waring, Chestnut Hill, Philadelphia 18.*

Airflex Couplings C

Engineering Bulletin 8105, 8 pages, offers construction features and dimensions of Airflex couplings, plus method of selection for engine driven systems and for systems involving shock.—*Falk Corp., Milwaukee 8.*

Sugar Mill Chains and Conveyors D

Chains and conveyors made of cast ferrous metal, tradenamed Z-Metal, are shown in 36-page Bulletin 50-27. Included are bucket elevators, belt conveyor idlers, and all chains, attachments and sprockets used in the sugar industry.—*Chain Belt Co., 1600 W. Bruce St., Milwaukee 4.*

Half-Depth Caser E

Four-page leaflet describes "Triple B" caser for placement of 6- and 12-oz. bottles in half-depth cases at speeds up to 160 a min.—*Wright Machinery Corp., Durham, N. C.*

Proportioning System F

A self-testing feeder-weigher, designed for stream delivery of small, crushed, granular or non-flushing, ground materials, is the heart of new proportioning and blending system reported in 6-page Bulletin 3849.—*Richardson Scale Co., Clifton, N. J.*

Materials Handling

Elevators and Cranes G

Hand- and electrically-operated elevators, telescopic portable types, barrel and drum elevators, and portable cranes with fixed or revolving base are detailed in 36-page Bulletin 4951. Capacities range up to 5,000 lb., and heights to 36 ft.—*Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9.*

Platform Trucks H

Specifications on new line of platform trucks are contained in leaflet.—*Rapids-Standard Co., Inc., Grand Rapids 2, Mich.*

Hand Hoists I

Compact hoists, available in capacities from ½ to 4 tons, are shown in 6-page Folder DH-164. Specifications, cross-sectioned view, and installations are given.—*Wright Hoist Div., Amer. Chain & Cable Co., Inc., York, Pa.*

Control Equipment

Industrial Control Devices J

Over 100 different models of non-indicating electric, electronic and pneumatic controllers are presented in 64-page Catalog 8303. Important additions to previous line are electronic temperature controllers, magnetic starters and contacters, heavy-duty pneumatic positioning

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DOWN, down, down to rock bottom go cleaning costs when you're dealing with time-tested Allegheny Metal. It happens in dairies, food-plants, hospitals, stores, restaurants, soda fountains, drug and chemical plants . . . *everywhere*!

In fact—and here's a truth for you to keep in mind—it costs far less over the long run to clean stainless steel and keep it clean than any other commercially-available metal. What's more, you can achieve more complete sanitation, get more lasting good looks and realize longer life in service. *No other metal* is as resistant to corrosion and heat as stainless steel—and at the same time as strong and as hard-surfaced and resistant to wear.

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meters, and electric step controllers.—*Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Wayne & Windrim Aves., Philadelphia 44.*

Liquid Meters A

Measuring and batching of liquid sugars, syrups, and water, using liquid meters, is described in 4-page Bulletin 573-3. Shown in detail is an automatic shut-off meter that can be set to operate for any desired quantity.—*Neptune Meter Co., 50 W. 50 St., New York 20.*

Thermometers B

Specifications and price list for 80 different commercial thermometers are presented in 8-page Catalog 16. Included are units for candy making, deep fat frying, cooking vats, refrigerator cars, maple sugar, and general testing.—*H-B Instrument Co., 2633 Trenton Ave., Philadelphia 25.*

Glass Pipe, Fittings and Specialties C

Four-page Catalog 94 contains dimensions of Pyrex glass pipe lines for use with threaded metal couplings. Sizes from ¼ to 3 in. are described. Precision bore specialties are shown in 8-page Catalog 95.—*Fischer & Porter Co., Hatboro, Pa.*

Laboratory Equipment D

Titled *Selected Laboratory Equipment*, Catalog 50 is a comprehensive compilation of scientific apparatus and equipment. It is alphabetically arranged, with occasional functional groupings.—*Schaar & Co., 754 W. Lexington St., Chicago.*

Laboratory Glassware E

Sizes and price list on line of laboratory glassware, including stoppers, ball and socket joints, stopcocks, and tubing, are illustrated in 12-page Catalog LP 28. Discontinued items are also listed.—*Corning Glass Works, Corning, N. Y.*

Water Hardness Determination F

Application of widely adopted S & B method for determining water hardness is described in 2-page Bulletin 44. Method is termed superior to soap measurement, and faster than gravimetric determinations.—*Allis-Chalmers Mfg. Co., Milwaukee, Wis.*

One-Pan Balance G

Reported to permit accurate analytical weighing to the fourth decimal place in 20 sec., one-pan balance, tradenamed "Gram-atic", is described in 4-page folder. Improvements are a cantilever-type beam, non-corroding stainless steel weights, and an anodized aluminum pan.—*Fisher Scientific Co., 717 Forbes St., Pittsburgh 19.*

Plant Supplies

Industrial Coated Fabrics H

Line of cotton and nylon base fabrics coated with neoprene, Buna-N and rubber is presented in 8-page Bulletin 11.—*Vulcan Proofing Co., 1 Ave. & 58 St., Brooklyn 20.*

Textile Belting I

Made of woven cotton duck and impregnated with a neoprene compound, new textile belt tradenamed "Supreme" is stated, in 4-page Bulletin 20, to be adaptable for many elevating and conveying requirements.—*Victor Balata & Textile Belting Co., 53 Park Pl., New York 17.*

Wire Screen and Cloth Products J

Company's entire line of woven wire screen and wire cloth products is covered in 64-page

the most highly purified monoglycerides on the market

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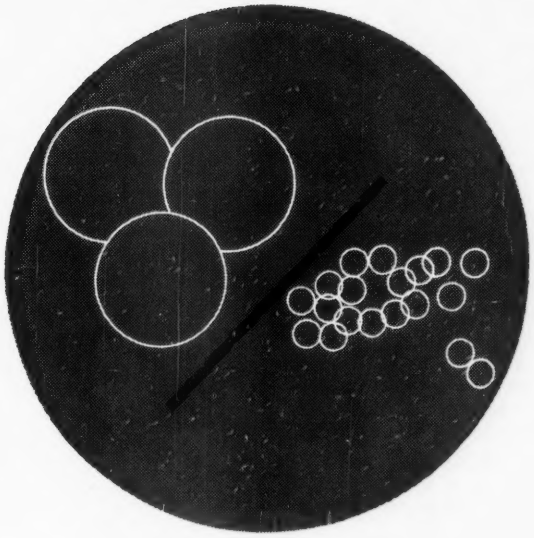

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A flaked solid glyceryl monostearate.

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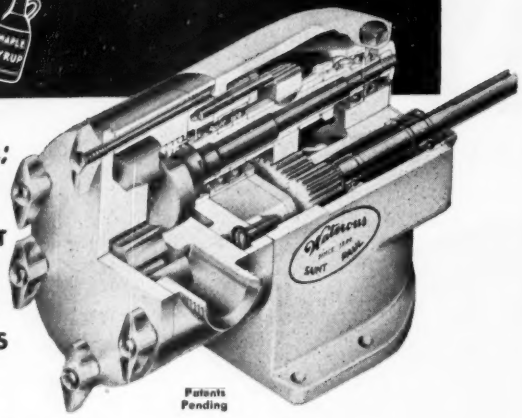

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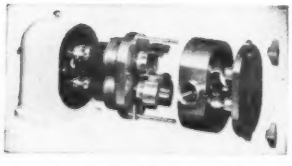
ADVANCED DESIGN provides accurate volume control, easier cleaning, longer life and minimum maintenance. Ideal for handling vegetables, fruit juices, frostings, milk products and many other food products. All wetted metal parts are 316 stainless steel. Built-in gear reduction permits the use of standard motors. As there are no metal contacts or friction between rotors and housing, flow settings remain constant. Thrust bearing located near liquid chamber minimizes internal expansion and contraction caused by hot or cold liquids.

Capacities.....1 to 125 GPM Speed.....50 to 600 RPM

Available in 316 stainless steel or nickel alloy.



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Catalog D. An introduction explains different types of wire cloth, including manufacturing procedure.—*Newark Wire Cloth Co., 351-365 Verona Ave., Newark 4, N. J.*

Lubrication Supplies and Data A

Recommendations and available lubricants are discussed in 44-page Data Book 1-50. Requirements for all types of industry are listed, but there is much material on food industries. —*Fiske Bros. Refining Co., 129 Lockwood St., Newark 5, N. J.*

Detergents, Bactericides B

Extensive line of detergents, bactericides, and other products for cleaning food and dairy plants, are covered in new catalog. Publication also contains much information, in non-technical terms, on various types of cleaning jobs. —*Klenzade Products, Inc., Beloit, Wis.*

Milk Plant Cleaning C

Five Aids to Easier Cleaning in the Milk Plant is title of 8-page booklet covering applications of Calgon and its compounds.—*Calgon, Inc., Hagan Bldg., Pittsburgh 30.*

Spray Nozzles D

Catalog 30 is designed to simplify selection of proper spray nozzle for industrial and air conditioning applications. Characteristics and dimensions are given.—*Industrial Div., Delavan Mfg. Co., 3009 Sixth Ave., Des Moines, Iowa.*

Miscellaneous

Foreign Development E

Eight-page booklet, *El Plan Armour*, printed both in Spanish and English, explains how Armour Research Foundation of Illinois Institute of Technology is pioneering "export" of technical assistance to undeveloped countries called for in President Truman's Point Four program.—*Armour Research Foundation, IIT, Technology Center, Chicago 16.*

Glassblowing Equipment F

Designed for laboratories maintaining a glassblowing department for repair and research construction of glass articles, 48-page Catalog 50 illustrates all types of required equipment. —*Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.*

Raw Materials List G

Tabulation and prices of essential oils, citrus concentrates, floral absolutes, floral concentrates, aromatic chemicals, fixatives, tinctures, oleoresins, balsams and gums is given in 12-page booklet.—*Fritzsche Bros., Inc., 76 Ninth Ave., New York 11.*

Continuous Tankhouse Process H

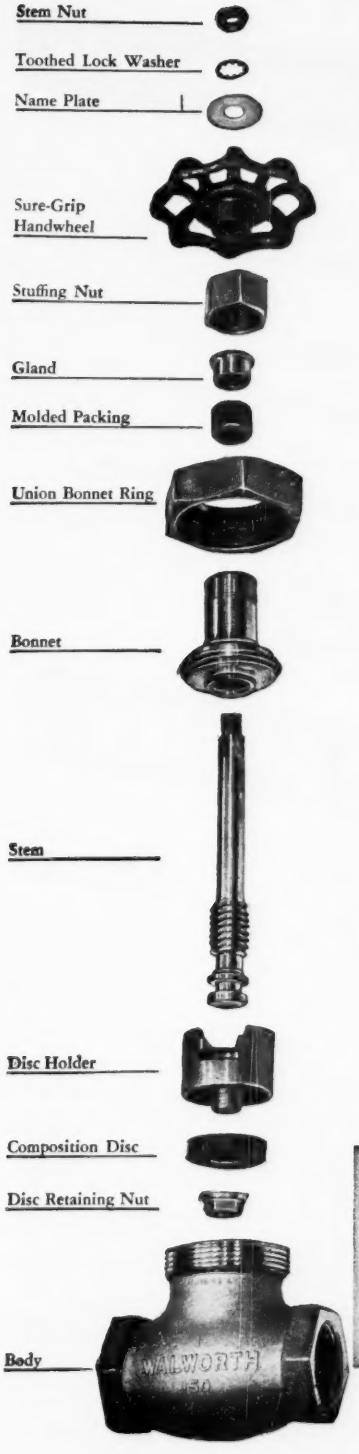
Low cost continuous reclamation of profitable products from tankhouse waste is illustrated in 8-page foldout Bulletin 1251. Waste includes gut slimes, tank bottoms, and sewage basin sludge.—*The Sharples Corp., 2300 Westmoreland St., Philadelphia 40.*

Refrigeration Computations I

Simplified refrigeration formulas, including complete examples for figuring number and size of either "quick-action" or "hold-over" plate type evaporators, are given in new catalog.—*Kold-Hold Mfg. Co., Lansing, Mich.*

Protective Linings J

Two new bulletins, C-6A and C-7, describe how to line wood and steel storage and process tanks for handling corrosives—*Carboline Co., 7603 Forsyth Blvd., St. Louis 5.*—*End*



TO MAKE A GOOD VALVE BETTER

Walworth has redesigned and improved its No. 95 Quality Bronze Globe Valve.

150 pounds working steam pressure at 500F

300 pounds cold water, oil, or gas.

Can be repacked under pressure when fully opened.

The Walworth No. 95 Bronze Globe Valve has always been tops with piping men because they liked these features: Renewable composition disc; lock-on, slip-off disc holder; union bonnet construction; deep stuffing box; tough bronze body made of Composition M (ASTM B61).

Now Walworth has added these improvements: (1) New cylindrical disc holder that accurately guides the disc to the seat, regardless of the position in which you install the valve. (2) Newly designed, air-cooled, sure-grip handwheel that you can grab and turn, even when wearing greasy work gloves. It has a tapered square hole sized to gage to fit snugly on the finished square of the stem. (3) Toothed lock-washer to prevent the stem nut from becoming loose. (4) All parts have been redesigned to give maximum service and strength.

Walworth Quality Bronze Valves are available in Globe (No. 95), Angle (No. 96), or Check (No. 97) types and in sizes from ¼ to 3 inches (check valves ¼ to 2 inches). Ask your Walworth distributor to show you the improved Walworth No. 95 Bronze Valve, or write for further details.

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A New Tool for PROCESSORS of FRUIT and VEGETABLE JUICES, SOUPS, PUREES, NECTARS, etc.

- External control of the solids content of the product
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- Ability to concentrate solids to a high degree and as desired
- Minimum loss of mother liquor with solids

plus greater purity

The Sharples DV-2 was developed specifically for the food industry. NO OTHER CENTRIFUGE HAS EVER APPROXIMATED THE PERFORMANCE OF THE DV-2.

The DV-2 removes undesirable material such as metal particles (both non-ferrous and ferrous), dirt, insects, and other foreign matter which inadvertently enter into even the most sanitary production lines.

Among the numerous present applications of the DV-2 is the processing of tomato catsup in which the tomato pulp is separated from the serum. The serum is then concentrated and the pulp is again added. No cooked taste is present in the final product; the flavor bodies and natural red color are retained.

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Patents

Vitamin E Enriched Oil Obtained From Wheat Germ by Extracting With Boiling Alcohol-Water, Cooling, Filtering, Evaporation, Re-Dissolving in Hot Water and Centrifuging Preliminary to Filtering, Condensing, and Extracting With Acetone—*W. D. McFarlane, Ste. Anne de Bellevue, Quebec, Canada, to Victory Mills, Ltd., Toronto, Ontario. No. 2,497,317. Feb. 14, 1950.*

Liquid, Condensed, Evaporated, and Dried Milks Stabilized by Addition of 0.05 to 1.0 Percent by Weight of 3-(Mercapto) Propionic Compound—*D. K. O'Leary, Kennet Square, Pa., to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,497,320. Feb. 14, 1950.*

Fish Meal and Oil Recovered From Fish Waste by Drying to 40-55 Percent Moisture, Heating, Pressing, and Drying Residue—*Olav Notevarp, Bergen, Norway, to Aktieselskapet Stord, Lervik, Norway. No. 2,497,367. Feb. 14, 1950.*

Unpopped Popcorn Held at Optimum Moisture Content by Storing in Atmosphere Exposed to Saturated Aqueous Solution of Sodium Chloride—*S. T. Dexter, East Lansing, Mich., to Michigan State Board of Agriculture. No. 2,497,399. Feb. 14, 1950.*

Lactalbumin Recovered From Whey in Form of Large Floating Cohesive Clumps—*E. C. Scott and G. W. McDonald, Chicago, to Swift & Co. No. 2,497,420. Feb. 14, 1950.*

Coffee Particles Suspended in Stream of Upwardly Moving Gas, Subjected to High Frequency Electrical Field to be Roasted and Density Reduced to Permit Transfer From Electrical Field by Gas Stream—*L. B. Himmel and R. V. Bush, Des Moines, Iowa, to R. M. Carrell. No. 2,497,501. Feb. 14, 1950.*

Carbohydrate Preserved by Addition of Stabilized Rosin Amine or Its Salts to Amount of About 0.25 and 10 Percent of Weight of Carbohydrate—*E. A. Briend, Newport, Del., to Hercules Powder Co., Wilmington, Del. No. 2,497,579. Feb. 14, 1950.*

Alkali Proteinate Solution or Dispersion Preserved by Addition of Stabilized Rosin Amine or Its Salts in Amount of 0.25 to 10 Percent of Weight of Proteinate—*R. W. Ivett, to Hercules Powder Co., Wilmington, Del. No. 2,497,610. Feb. 14, 1950.*

Grain Dried and Treated During Passage Downward Through Chamber Equipped With Plurality of Sieves Arranged to Provide Continuous Path of Grain From One End of Chamber to Other With Agitation and While in Contact With Drying or Treating Medium Under Damper Control—*F. B. Todd, Merriam, Kans. No. 2,497,703. Feb. 14, 1950.*

Small Amounts of Propylene Glycol and Soluble Sodium Phosphite Added to Bottled Liquid Coffee Brew to Retain Its Freshness —*J. H. Foulkes, to Finer Foods Packing Corp., Terre Haute, Ind. No. 2,497,721. Feb. 14, 1950.*

Shell Eggs Subjected to 130 Deg. F. Liquid for About 7 Min. and Then to 136 Deg. F. Liquid for About 7 Min. for Retention of Fresh Egg Quality—*C. Hale, G. Ellyn, and P. Schauert, Chicago, to Swift & Co. No. 2,497,817. Feb. 14, 1950.*

Starch Conditioned for Enzymic Conversion by Addition of Acid Solution of Magnesium Phytate to Starch Slurry Adjusted to pH of 5 to 8 to Obtain Precipitation of Phytate on Starch Preliminary to De-Watering and Drying—*J. M. Newton and L. D. Ough to Clinton Industries, Inc., Clinton, Iowa. No. 2,497,838. Feb. 14, 1950.*

Protamines Obtained From Fish Milt by Extraction With Dilute Acid Followed by Alkaline Precipitation for Recovery of Filtrate and Treatment With Alkaloid Reagent—*R. J. Block, Scarsdale, N. Y., to The Borden Co., New York City. No. 2,497,858. Feb. 21, 1950.*

Shell Eggs Subjected to Abrasive Cleaning During Forward Movement Along Moving Belt—*H. T. Linsmeier, Sankville, Wis. No. 2,497,949. Feb. 21, 1950.*

Potato Slices and Like Immersed in Bath of 0.25 to 3 Percent Sugar Solution for 1 to 3 Min. Preliminary to Frying at 300 to 425 Deg. F. to Obtain Desired Color Intensity—*J. L. Baxter, Brunswick, Maine. No. 2,498,024. Feb. 21, 1950.*

Shell Eggs Mechanically Opened and Separated Into Shell and Meats—*E. W. Schaber, Sholes, Nebr. No. 2,498,182 Feb. 21, 1950.*

Tea Packaged in Infusion Bags Having Highly Permeable and Closely Interlaced Web of Cellulosic Fibers Bonded by Non-Toxic, Substantially Odorless and Tasteless, Hot-Water Repellent Lacquer—*T. R. Baxter, Mount Vernon, Ohio, to Standard Brands, Inc., New*

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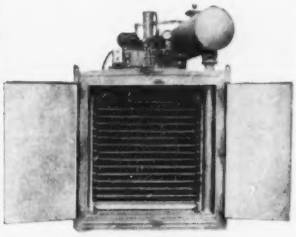
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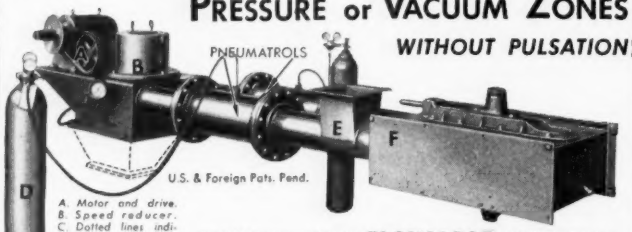

A. Motor and drive. B. Speed reducer. C. Dotted lines indicate position of pressurized hopper in actual installation. D. Tanks supplied air source for actuating Pneumatrols in test set-up. E. Receiving hopper. F. Standard take-up for Hapman chain conveyor.

The restricted nature of most new processes prevents securing plant photographs of the Pneumatrol installations now operating successfully. Names will be furnished on request.

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This photo shows the testing set-up prior to shipping an installation of a Hapman circular flight chain conveyor equipped with Hapman Pneumatrols. The pressure-sealed Pneumatrols used with the Hapman pressure-tight, chain-link and flight assemblies, make it possible to convey any *flowable* material into or out of vacuum and pressure zones intermittently, continuously or it can be processed in motion through these zones. Complete information on request.

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York City, N. Y. No. 2,498,197. Feb. 21, 1950.

Thiamin Solutions Stabilized by Addition of Thioglycerol, Thiosorbitol or Thioglucose—*M. D. Bray, Noblesville, Ind., to Eli Lilly and Co., Indianapolis, Ind. No. 2,498,200. Feb. 21, 1950.*

Riboflavin Synthesized by Growing *Eremothecium ashbyii* on Mash Consisting of Ground Whole Wheat and Barley Malt—*R. M. James, to Commercial Solvents Corp., Terre Haute, Ind. No. 2,498,549. Feb. 21, 1950.*

Rice Containing From 13 to 16 Percent Moisture Tempered for ¼ to 3 Days at About 30 Deg. C. to Raise Moisture Content to About 29 Percent, Subjected to Steam Temperature of 100 to About 130 Deg. C. to Obtain Surface Gelatinization and Raise Moisture Content to About 34 or 35 Percent Preliminary to Drying of Rice to Moisture Content Between 14 and 24 Percent—*A. K. Ozai-Durrani, Stuttgart, Ark. No. 2, 598,573. Feb. 21, 1950.*

Fruit, Vegetable Juices and Like Concentrated Under Vacuum to Permit Heated Vapors From Lower Part of Chamber to Pre-heat Juices Being Sprayed Into Upper Part; Concentrated Juices Removed From Lower Portion of Chamber—*J. A. Cross, Westerville, Ohio, to Mojonnier Bros. Co., Chicago. No. 2,498,836. Feb. 28, 1950.*

Raisins Heated to Between 158 and 165 Deg. F. Without Loss of Moisture Content and Cooled to About 125 Deg. F. by Passing Through Cool Water Preparatory to Removal of Caps and Seeds—*T. W. W. Forrest to Fewel Bros. Packing Co., Fresno, Calif. No. 2,498,949. Feb. 28, 1950.*

Fish With Heads Removed Mechanically Cleaned by Suction Action of Reciprocating Piston—*M. K. Kuther, Monterey, Calif. No. 2,498,933. Feb. 28, 1950.*

Wax Recovered From Sugar Cane Press-Cake Containing From 2 to 10 Percent Filter Aid by Making Slurry of Cake Solids, Extracting With Water-Immiscible Organic Solvent, Filtering and Removing Solvent From Filtrate—*O. J. Swenson, Ithaca, N. Y., to The Cuban-American Sugar Co., New York City, and S. C. Johnson & Son, Inc., Racine, Wis. No. 2,499,008. Feb. 28, 1950.*

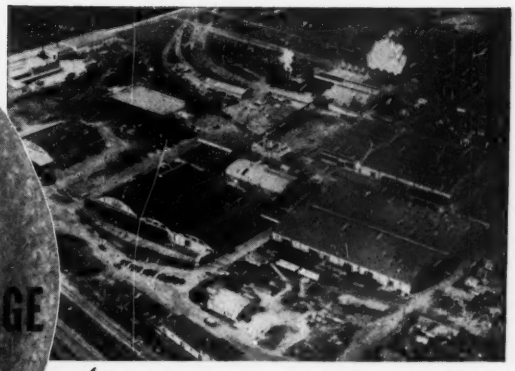
Bakery Dough Extruded Under Gas Pressure From Supply Tank Fitted With Element Set for Maximum and Minimum Limits to Control Extrusion Operation—*P. A. Wolff, Hoboken, N. J., to General Baking Co., New York City. No. 2,499,206. Feb. 28, 1950.*

Raw Untreated Edible Liquids Contained in Sterile Closed Container at Atmospheric Pressure Subjected to Upward Passage of CO_2 to Sweep Out All Other Gases in Liquid and Head Space of Container, Subjected to CO_2 Under 6 Atmospheres of Pressure for Not Less Than 4 Hr., Heated at Atmospheric Pressure Until CO_2 is Substantially Removed, Aerated With Molecular Oxygen to Remove All Other Gasses From Liquid and Head Space of Container, Subjected to Molecular Oxygen Under 6 Atmospheres of Pressure for About 4 Hr., Stored Under 3 Atmospheres Pressure of Molecular Oxygen—*A. Franklin, Caracas, Venezuela. No. 2,499,243. Feb. 28, 1950.*

Fruits Oriented and Supplied to Pitting Machine by Rotatable Feed Drum Having Plurality of Peripheral Rows of Fruit-Holding Apertures—*E. W. Carroll, Redwood City, Calif., to S & W Fine Foods, Inc., San Francisio. No. 2,499,266. Feb. 28, 1950.*

DEHYDRATING, MOLASSES REFINING, and CANNING PROCESSES at TEXSUN CITRUS EXCHANGE

Demonstrate Versatility of GAS



TEXSUN CITRUS EXCHANGE PLANT, WESLACO, TEXAS. Dehydrating and concentrating plant is shown at upper right, where cloud of vapor indicates evaporation of moisture from dehydration of citrus peel.

CITRUS BY-PRODUCTS processing is a large part of the operations of Texsun Citrus Exchange, Weslaco, Texas. One of the world's largest processors and canners of citrus, Texsun not only packs juices and edible fruit but processes the residue into citrus molasses and citrus pulp used in stock feeds.

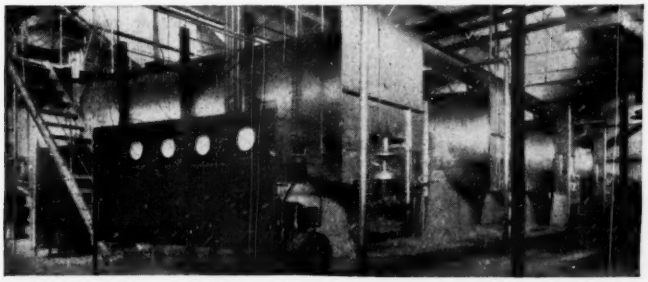
Although Gas is used for all Texsun heating operations, its major role is in the dehydration and refining process. The rotary kiln method, which consists of eight 90′ kilns with a total capacity of 40 tons of raw products per hour, is the dehydration process which completely dries the pulp and peel.

A unique method developed by Texsun, to purify and retard fermentation of their citrus molasses products, is to inject natural gas and air directly into the liquid, igniting it and causing it to heat as it bubbles to the surface.

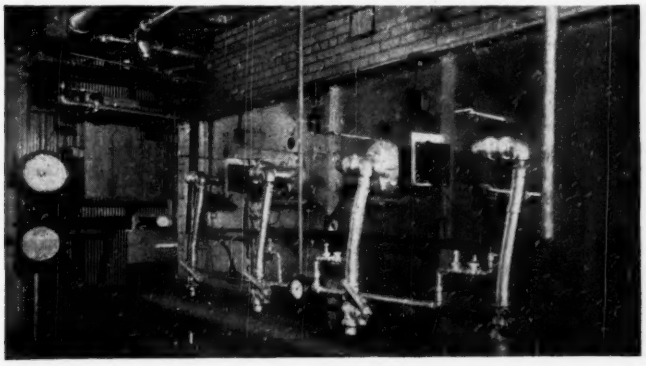
Sid Rankin, Supt. of Dehydration at Texsun emphasizes the importance of retaining color and vitamin value in the finished product, which requires heat-processing at precise temperatures just below the boiling point. Mr. Rankin states—"We could not turn out a product of such high quality without the use of natural gas as it is readily controlled and is very economical. In our patented process in the manufacturing of citrus molasses, natural gas is indispensable."

Texsun has used GAS for heat-processing since the Weslaco plant was built in 1936. These applications of GAS represent some of the important ways in which GAS serves the food industry. Ask your Gas Company Representative about other heat-processing applications in your business.

Battery of Gas-fired dryers from firing end, and showing control panel. Kilns are 90 feet long, with 30 foot firing chambers.



Gas Burner on one of the boilers which generates steam for processing.



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Research All the Way

—*Continued from page 44*

Serious difficulties were avoided only by accident.

Most new products are, by nature, specialty items and require specialty sales methods. Often their novelty has news value which can be used to secure free publicity. Food editors, writers and commentators may be invited to a party where the new food product is featured. Members of the research department may be interviewed by home economist radio commentators. News releases containing valuable recipes and attractive pictures may advantageously be prepared by Research for supplying to newspaper women's pages.

Store demonstrations serve a double purpose of acquainting consumers with the flavor of the product and also enable Research to obtain information which is invaluable in modifying labels, packages or composition.

Pointers on Prices

Cutting prices is rarely of avail in introducing a new product. A canner of citrus juices packed a blend of grapefruit and tangerine juices which had not been previously offered. Cases of the new product were sent to the company's brokers, and their response was enthusiastic. Accordingly, a commercial pack was undertaken, and the product was distributed to retail dealers, who liked the product when it was sampled to them by broker salesmen.

However, the product stood on grocery shelves. Under the pressure of selling a variety of established products, the newcomer was overlooked. It was then decided to cut prices to move it out of stock, yet at prices below cost it still refused to move.

Then it was suggested that the price be raised sufficiently to cover the cost of store demonstrations which were conducted competently. Result: Repeat sales followed in satisfactory volume, and markets for the new product were established.

Although store demonstrations are one of the most effective methods of introducing a new product quickly, the cost is high. One packer of a new frozen orange concentrate, who used a popular cartoon character as a brand, had easels 5 ft. high brilliantly printed with the cartoon character smiling and offering the new product to customers walking through the aisles of the markets. Store managers reported tripling of sales when this relatively low cost substitute for store demonstrators was prominently displayed.

The psychology as well as the taste buds of consumers is involved in the acceptance of food products. Unless Research is familiar with *all* the facts, it cannot serve most effectively in the introduction of a new food item.

Twenty years ago, efforts to deliver freshly squeezed orange juice and frozen single strength orange juice with milk were a failure in some markets because customers were alarmed by the sudden increase in the milk bill, not stopping to realize that their their grocery bill was correspondingly reduced.

Still another function of Research in the introduction of new foods is in relation to State and Federal Agencies interested in establishing standards of definition and grade. Most agencies provide for preliminary hearings where industry is invited to present views, which are considered in formulating tentative standards. Then, unless complaints or suggestions are received from individuals or groups in the industry over a reasonable period, it is assumed that the tentative regulations are satisfactory, and they are made official. A function of Research is to work with industry standard committees in attempting to avoid bad standards and in registering comments promptly and effectively when tentative standards need to be revised.

Recently, in one state, arbitrary standards were set for new frozen food products by action of the state legislature. No provision was made for preliminary industry hearings, and no provision is included in the law for consideration of suggestions or complaints. The law is explicit and inflexible and can only be modified during biennial meetings of the legislature by political action. Such a development will pose a real problem to the research departments of food manufacturers if other states should follow this precedent.

—End—

"Moving Those Dries"

—*Continued from page 57*

with round holes in them just large enough to receive the shaft. On the outside of the housing there is a duplicate pair of plates. Bolts welded to the inside plates extend through slots in the housing and through bolt holes in the outer plates.

When it is necessary to raise the upper shaft, for take-up in the belt, the nuts are loosened on the outer plates. Long threaded bars (Fig. 6) serve as jacks to raise the four plates, and the shaft. When proper belt tension is obtained, the nuts are tightened, clamping the inner and outer plates together. Even without felt gaskets, the bolted plates are dust tight.

The shaft runs in ball-bearing pillow blocks mounted on brackets attached to the outer plates. Pillow blocks with self aligning ball bearings are quite satisfactory. In this type bearing, the outer ring of the bearing is spherically ground so that the bearing will seek the proper angle for smooth performance. The bearing proper has felt seals on both sides. These are thoroughly tight. There have been instances where these bearings have run for long periods submerged in sugar—and without failure.

Grease fittings come with the pillow blocks, but as with all sealed bearings too frequent greasing does more harm than good. When babbitt bearings are used, thrust collars must be provided.

Ball bearings require no collars because the set screws take the slight end thrust. Taking into account the thrust collars and the frequent greasing required for babbitt bearings, the ball type bearing is the best and lowest in cost. The packing glands are on the outer plate between the bearing supports. Outside packing glands and ball bearings are also used on the lower shaft in the boot.

A simple and effective method of making the packing glands is to countersink the outer plate where the shaft protrudes. Four holes are drilled in a large washer or steel disk to match four bolts welded to the plate. The hole in the washer or disk should be countersunk and just fit the shaft. The washer is placed on the shaft with the countersinking next to the plate.

Graphite packing is wound around the shaft between the outer plate and washer. Tightening the nuts on the bolts will pull the washer tight against the packing. As the two countersunk surfaces approach each other, the packing is squeezed against the shaft. The pillow block bearing is mounted on a bracket to allow sufficient space beneath to tighten the packing gland without removing the bearing.

A roller chain connects the sprocket on the upper puller shaft with the sprocket on the reduction gear shaft. Gear reducer and motor are mounted on a shelf welded to the housing. The drive from the motor is through V-belt. This drive is preferable on new installations. It permits changing speeds by changing V-belt sheaves. And there is another advantage to the V-belt: It will always slip in case of overload or jamming before any damage can be done.

The discharge head of the elevator is designed to overhang the intermediate or center section of the elevator by the width of a trough screw conveyor. If this is not done, transi-

tion sections will have to be designed each time a screw conveyor is attached. A baffle plate is built into the hood extension, forming a discharge chute (Fig. 7). The upper edge is placed ½ in. from the buckets at the point where they have rounded the upper pulley and have just started their vertical descent. The baffle slopes down to the upper edge of the screw conveyor. If the baffle is not used, a portion of the product will constantly spill down the elevator to the boot and be recirculated. This spillage holds back materials fed by the infeed conveyor and overloads the system.

Bucket elevators may be employed that use chains instead of belts. When chains are used, horizontal as well as vertical runs can be made. Chains are preferable for wet or moist products, but have the disadvantage of continuous wear when dry powders are handled. At times, dry products will build up sufficiently at the chain joints to cause them to bind.

Details on the construction, application, operation and addition of effective members to trough and tube type screw conveyors will be covered in the concluding Part II of this article, to be published in a subsequent issue of FOOD INDUSTRIES.

—End—

Tailor-Made Dry Milks

—Continued from page 53

Coffee has a certain degree of acidity and contains other substances which coagulate the proteins in milk products. In addition, coffee is usually served hot, and heat ends to coagulate milk. Normally processed cream powders "feather" in coffee, and "oiling-off" of fat is also a problem, especially in a pelleted cream. By extensive research and a study of customer's needs, we were able to provide a powdered cream that simulated fresh fluid cream when used in coffee.

As every baker knows, not all nonfat dry milk solids will "bake." On the other hand, it has been general knowledge that high heat treatment of nonfat dry milk improves its baking properties. Apparently this treatment alters the proteins so that they become more compatible with the gluten of the flour. Also, this treatment renders the proteins more hydrophilic, which aids water absorption in the dough.

With the aid of evaporating and drying equipment of our own design, a new nonfat powder has been developed which has exceptional water-absorption powers. Laboratory tests show that this powder gives the baker

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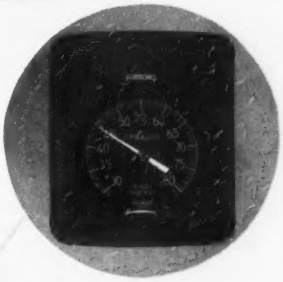

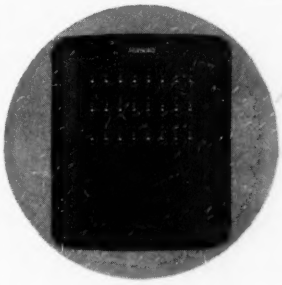

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lower net cost, decreases mixing time, improves bread texture, and also makes the time element involved in mixing doughs "less sensitive." This new powder allows the use of a higher proportion of milk solids without disturbing any of the established baking procedures.

Another tailor-made, low-heat processed, nonfat milk powder was designed for use in the manufacture of cottage cheese and buttermilk, and for reliquifying with butteroil for reconstitution purposes. It has found a further application in hard cheese manufacture, particularly where nonfat dry milk solids are needed to standardize the fat ratio in high-fat milk producing areas. To meet the requirements of some local and state ordinances (those which prohibit the use of manufacturing-grade milk in fluid and dry form in cheese and other products) this powder is also made from Grade A milk.

The special low-heat process by which this powder is made results in a product that is essentially unaltered and, therefore, able to perform satisfactorily with the rennet and starter used in cheese and buttermilk manufacture. Care in processing also results in retention of good solubility and uncooked flavor.

For the past twelve years, we have marketed a special nonfat dry milk made exclusively for ice cream manufacturers. In addition to the good water absorptive qualities required for better textured ice cream, this powder has unusual ability to prevent sandiness.

—End—

Storing Your Candy

—Continued from page 64

emphasis was made on protective packaging.

Maintenance of specific atmospheric conditions—particularly low relative humidities——is much more important for storing candies than certain temperatures within narrow ranges. But this does not imply that low cooler temperatures will not prolong the shelf-life of candies.

The moisture content of candies has a bearing on the relative humidity at which they must be stored. For example, hard candies (suckers, stick candies, caramels, drops and peanut brittle) with a moisture content of about 0.75 percent must be stored at a relative humidity below 40 percent. If they are not, these items will pick up moisture (and gain weight), become sticky, clump together, and the colors will run.

In other tests conducted at the Georgia Agricultural Experiment Station, it was shown that candies with a 5 to 7 percent moisture content can be successfully stored at a 55 percent relative humidity. Such candies include chocolate covered creams, nuts, and fruit; chocolate bars; coconut candies; and cream mints.

Slightly moist candies, such as marshmallows with a 16 percent moisture content, keep best at 65 percent relative humidity, regardless of the temperature.

It is extremely difficult to store hard candies without having them form clumps. However, several warehousemen reported that by jarring the packages they can break up the clumps—provided the condition is not too serious.

Hard or semi-hard confections, such as crystallized coconut squares that do not contain either chocolate, nuts, or fruit, can be temporarily stored at 140 deg. F. without any adverse effects. When held under high relative humidities, on the other hand, these candies turn white within a short time. They also become sticky and lose their finish. But prolonged storage at high humidities causes them to become soft and the colors to run. And when these items are then redried, they take on a dull appearance and chalky texture.

It is best to package hard candies in glass jars, cans, or tight kegs with water vapor-proof liners. If moisture-sensitive candies are packaged to keep out water-vapor, the job of cold storage can be carried out more effectively. One good suggestion for avoiding condensation is never to break the vapor seal in packaged confections until after they have been temperature-conditioned.

Until there is more knowledge on the best methods for storing different candies, warehousemen must be guided by the storage specifications set by candy manufacturers. These specifications ought to be in writing, otherwise the candies should not be accepted for storage. For example, the candy maker should specify whether or not he wants his chocolate-coated cherries to cordialize during storage. If he does, then he must issue instructions for storing them at 68 to 70 deg. F. And if he doesn't, he must have them stored at 45 deg. F. Better yet, the candy maker can retard cordialization by modifying the ingredients used in manufacturing these candies.

Undesirable conditions, even those appearing doubtful, for storing confections should be reported to the candy manufacturer. This point has been strongly stressed by a number of warehousemen.

Two warehouses with long and suc-

cessful experience in storing chocolates made almost parallel recommendations. Other warehouses as well as candy manufacturers, reported storage practices that varied "all over the map."

Of the two successful houses, one recommended storing chocolates at 64 to 66 deg. F. with a relative humidity not exceeding 60 percent. In this case, it would be unnecessary to temper the chocolates before removing them from storage.

The other house came up with two procedures: (1) Holding the chocolates at 32 deg. F. with a 50 percent relative humidity and then tempering them to 45 deg. F., and (2) keeping them for summer distribution at 60 to 65 deg. F. with a 50 percent relative humidity—tempering not required.

A well known chocolate manufacturer pointed out that solid chocolate can be safely stored for two years at 68 deg. F. with a 52 percent relative humidity.

Where candy storage and surrounding rooms vary widely in temperatures, it is difficult to control humidity, and accordingly the condensation of moisture on the candies after they are removed from storage. However, portable calcium dehumidifiers can be useful in areas where condensation might occur. Another practice is to install steam coils in storage rooms so that the temperature of these rooms can be raised before removing the candy.

—End—

"Go West, Young Yam"

—Continued from page 58

was not stopped in that state and proceeded with its load intact to destination.

The Great Dane semi-trailer in which the load was carried is of the refrigerator type, but no refrigerent was used on the trip. Instead the screened ventilating apertures in the nose of the trailer and its two rear doors were left open to allow a circulation of air through the body from front to rear.

With this run made in the Fall, air circulation between the bushel baskets (loaded as shown in the photo) enabled delivery of the potatoes in prime condition. If such loads were delivered regularly during the hot months of June, July and August, refrigeration down to about 50 deg. F. likely would be called for.

The load was moved by Glasgow & Davis operating under Motor Carrier Bureau rights as a contract carrier on irregular routes. On the return trip, three separate backloads were hauled,

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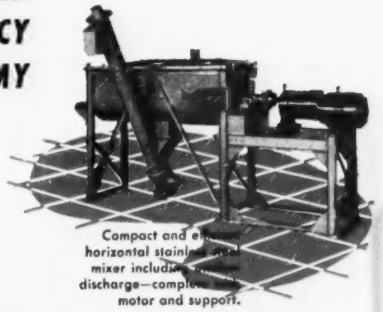
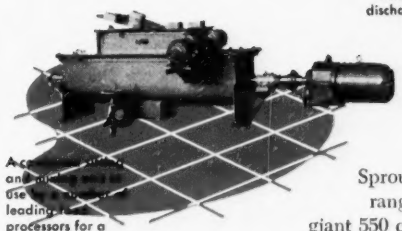


Compact and e… horizontal stainl… mixer includ… discharge—comple… motor and support.



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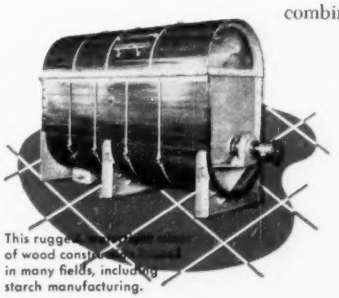

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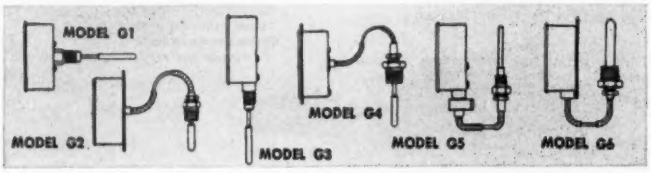

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HEADQUARTERS FOR BUSINESS INFORMATION

McGRAW-HILL publications

F-23

so that full loads were carried in both directions.

From Los Angeles to Denver a full load of miscellaneous freight was carried. Another load of miscellaneous freight was carried from Denver to Chicago. And from Chicago a load of cased eggs was carried to Baltimore, Md.

—End—

Frozen Concentrated Milk

—Continued from page 39

storage, and by not concentrating to high solids.

4. Simple reconstitution.

In his experiments at Pennsylvania State College, Prof. F. J. Doan has found that frozen concentrated milk is most easily reconstituted in hot water (180 deg. F.). But this is a very unsatisfactory method for the consumer who is familiar with the much more convenient handling of frozen citrus concentrates. Other researchers have found that slow thawing (in the home refrigerator) permits satisfactory reconstitution with tap water.

5. Proper packaging.

A study has been made of the various containers of tin, fiber and paper to determine which will withstand frozen storage without contributing off-flavors to the milk. Can companies have developed some new liners in the past year. These look promising. But they must be thoroughly tested before there is real assurance of suitability.

And just what will the package look like? The dairy people seem to think that a ⅓-qt. container (which will reconstitute into a full quart by adding two parts of water) would be best.

On the economic front there are several important problems:

1. How will the cost of frozen concentrated milk compare with fresh milk?

Consensus of dairy industry researchers is that production costs will be too high to permit competition with bottled fresh milk in cities adjacent to producing areas (see Table). At the moment, the dairy companies are interested in the possibility of frozen concentrated milk as a means of absorbing surpluses in producing states and supplying non-producing areas, such as Florida.

2. What competition may be expected from other forms of milk?

In addition to a battle between frozen concentrated and fresh milk, there is also the chance that there will be severe competition from an

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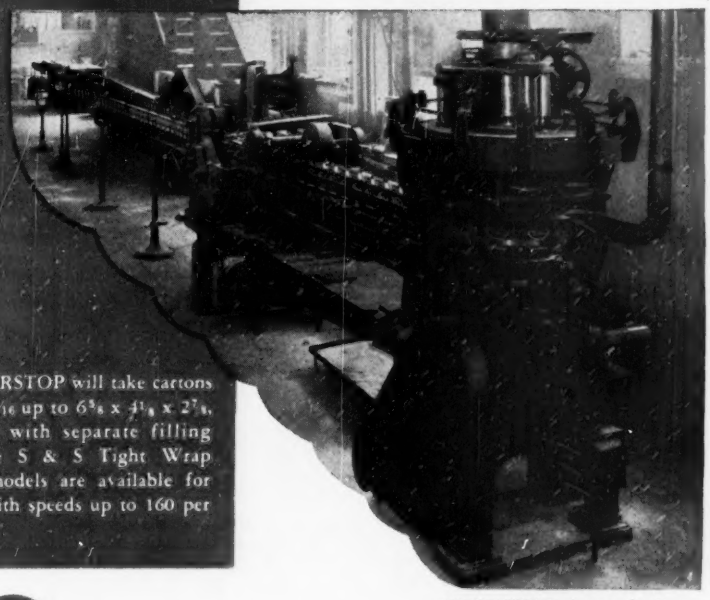

Model "D" NEVERSTOP will take cartons from $4\frac{9}{16}$ x 3 x $1\frac{7}{16}$ up to $6\frac{3}{8}$ x $4\frac{1}{8}$ x $2\frac{7}{8}$, and can be used with separate filling machines and the S & S Tight Wrap Machine. Other models are available for larger packages, with speeds up to 160 per minute.

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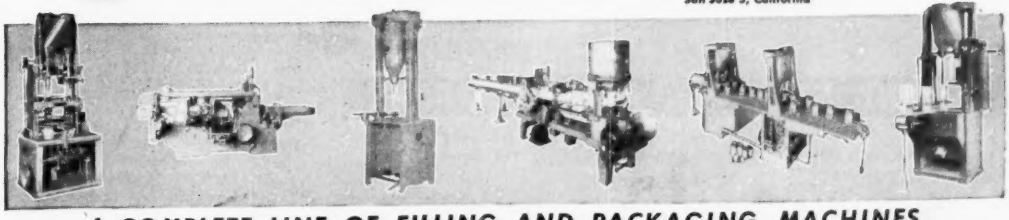

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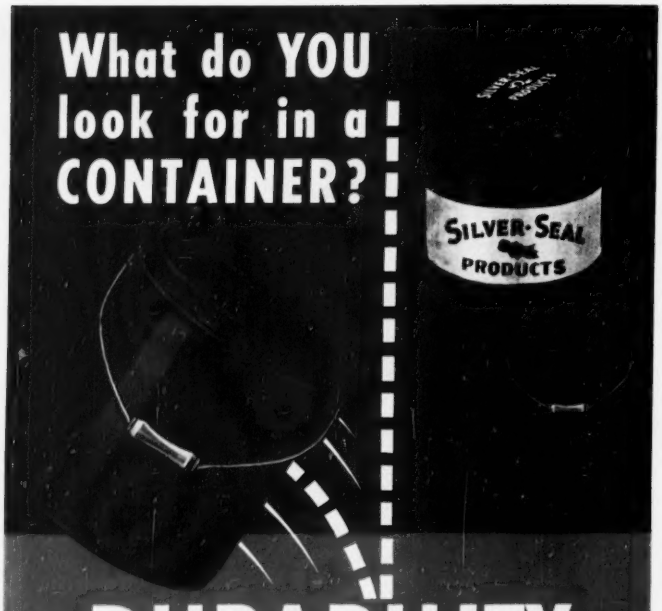

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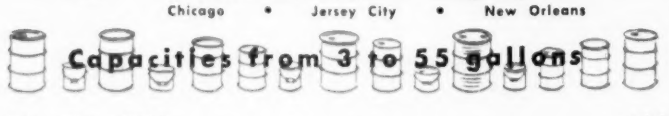

improved sterile evaporated milk. Much research is being carried on with a 3-to-1 evaporated, sterilized, aseptically canned milk aimed at avoiding the dark color and cooked flavor of existing evaporated milk. The just-announced formation of a company to can fresh milk for the Alaskan market, by the process developed by Dr. Roy E. Graves, seems to indicate that progress is being made along this line also. Company concerned is International Milk Processors, Inc., Chicago, which plans to build a $200,000 plant at East Stanwood, Wash.

3. And what are the legal aspects? Frozen concentrated milk, if it is not sterile, will be vulnerable to attack by local dairy interests and health departments. Present health codes in many cities might prohibit its sale—especially if antioxidants or stabilizers are added.

Particularly, it must be emphasized that the "frozen" process is not necessarily the only reasonable road to the new packaged-milk goal. Maybe a "non-frozen" product—sterilized and aseptically canned—could come along and "take the play", marketwise, from the frozen-type milk. It's not beyond conjecture. But a frozen product, if orange juice is any criterion, would have considerable consumer appeal. —*End*

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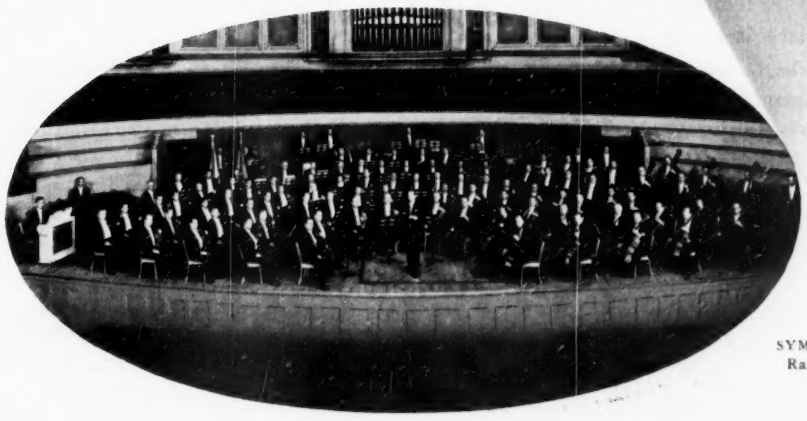

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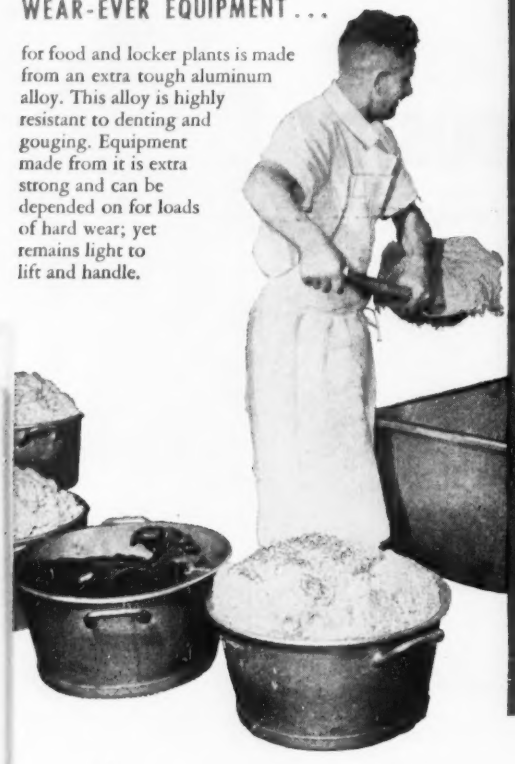

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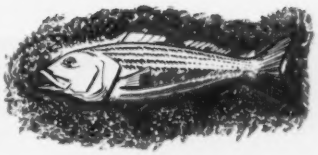

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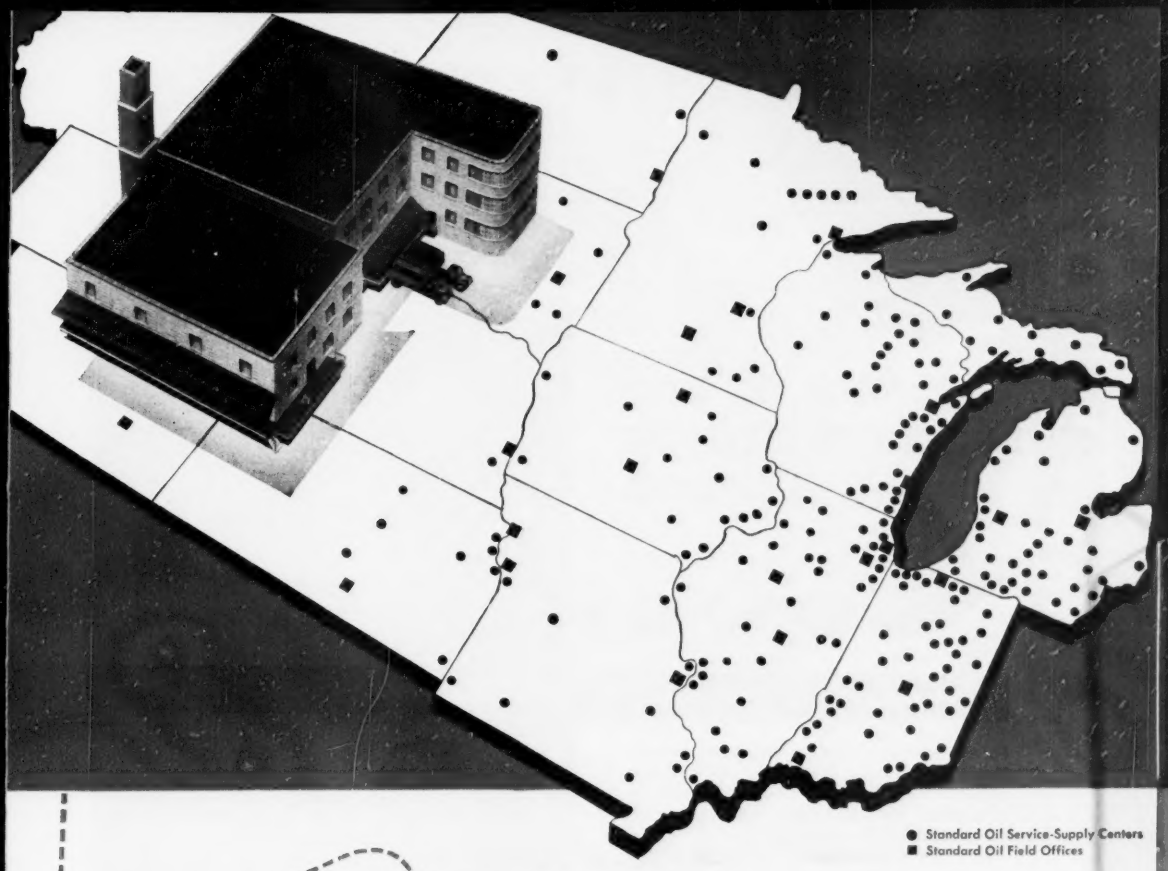
OKLAHOMA CITY, OKLA.
Carpenter Paper Company
OMAHA, NEBR.
Carpenter Paper Company
PHILADELPHIA, PA.
Rhodes Paper Company
D. L. Ward Company
PITTSBURGH, PA.
Whitaker Paper Company
PORTLAND, ORE.
West Coast Paper Company
PROVIDENCE, R. I.
Carter, Rice & Company
PUEBLO, COLO.
Carpenter Paper Company
RALEIGH, N. C.
Epes Fitzgerald Paper Co., Inc.
RICHMOND, VA.
Epes Fitzgerald Paper Co., Inc.
ROCHESTER, N. Y.
The Alling & Cory Company
ST. LOUIS, MO.
Acme Paper Company
ST. PAUL, MINN.
Carpenter Paper Company
The John Leslie Paper Company
SALT LAKE CITY, UTAH
Carpenter Paper Company
SAN ANTONIO, TEX.
Carpenter Paper Company
SAN FRANCISCO, CALIF.
Carpenter Paper Company
SEATTLE, WASH.
West Coast Paper Company
SIOUX CITY, IOWA
Carpenter Paper Company
SIOUX FALLS, S. D.
The John Leslie Paper Company
SPRINGFIELD, MASS.
Bulkley, Dunton & Company
SYRACUSE, N. Y.
The Alling & Cory Company
TOPEKA, KANSAS
Carpenter Paper Company
WASHINGTON, D.C.
Whitaker Paper Company
WORCESTER, MASS.
Charles A. Esty Paper Company

EXPORT

MEXICO, CENTRAL AMERICA, SO. AMERICA, SO. AFRICA, and the FAR EAST
American Paper Exports, Inc., New York City
UNITED KINGDOM, EUROPE, NO. AFRICA and the NEAR EAST
I. J. Saper, 65 Ave. Niel, Paris



Right in your own back yard!

● If your plant is in the Midwest, you can benefit from a service-distribution set-up that is unique in the oil industry—there's a Standard Oil office and warehouse practically right in your own back yard. The nearness of that service-supply center holds important advantages for you.

Faster Deliveries. You needn't worry about production delays caused by late shipments of necessary lubricants and fuels. You can avoid the expense and trouble of stocking large quantities of lubricants and fuels within your plant.

A Complete Supply. Every lubricant and fuel necessary to the efficient operation of your plant will be carried in the warehouse at your nearby Standard Oil service-supply center. You can always get the product you need *when* you need it.

On-the-Spot Engineering Service. Your nearby Standard Oil service-supply center is headquarters for a Standard Oil Lubrication Specialist who is assigned to your plant. He is close at hand to give you help when you need it. He has plenty of practical experience. He has been specially trained for his job in a Standard Oil Lubrication Engineering School. He is backed by Standard Oil's extensive research and technical facilities.

To arrange for his visit, phone your nearby Standard Oil service-supply center or write to: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

3 IMPORTANT ADVANTAGES

Standard Oil's Lubrication Service is especially geared to serve your midwest operations.

1 Service-supply points are near your plant. You are assured of fast deliveries, prompt lubrication engineering service.

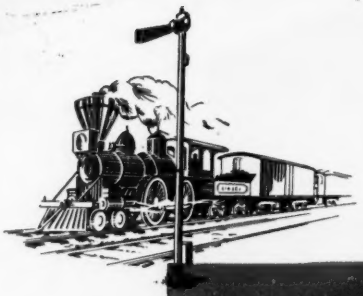
2 Lubrication specialists have been specifically trained in Standard Oil Lubrication Engineering Schools to help you obtain the maximum benefits from lubricants and fuels.

3 Research and technical facilities are geared to help solve your specific lubrication problems.

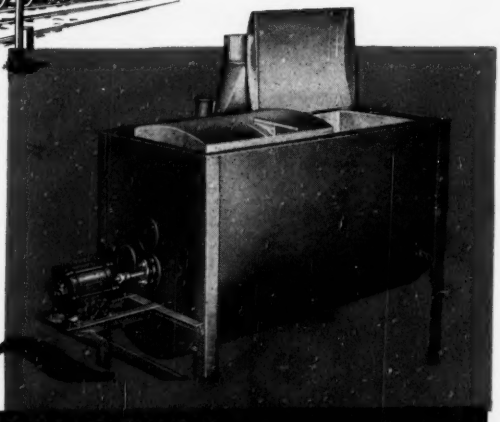
STANDARD OIL COMPANY (INDIANA)

STANDARD

BACK IN THE 1880's



Jacketed mixing tank.
Stainless steel inside.
Steel outside.



WHEN THE FIRST
POWER OPERATED SEMAPHORE
WAS INVENTED

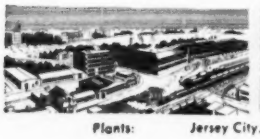
Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

For over 68 years, KOVEN has helped the food industry to achieve more efficient and more economical production through the use of individualized food equipment. This equipment is designed and built to meet your specific requirements. A KOVEN representative will be glad to discuss your production problems at no obligation. In our two vast plants are modern machine, welding, painting and galvanizing shops. X-ray inspection insures quality control.

Among the many KOVEN products in all commercial and non-corrosive metals: Stainless Steel; Aluminum Sheet Fabrication; Boxes, Tote, Waste Cans; Chemical Apparatus; Coils and Pipe Bands; Copper Sheet Fabrication; Galvanizing Work; Mixers, All Kinds; Monel Metal Fabricators; Pails, Special Heavy; Pans, All Types, All Metals; Sinks, Scullery and Factory; Tables, Galvanized or Monel; Tanks, All Types, All Metals; Kettles, All Types, All Metals.

L. O. KOVEN & BRO., INC.
154 Ogden Ave., Jersey City 7, N. J.



Plants: Jersey City, N. J. Dover N. J.

Vacuum cooking kettle of stainless steel.

KOVEN FOR INDIVIDUALIZED FOOD EQUIPMENT SINCE 1881

Bags fabricated by Flexible Package Co.

NOW! pre-packaged fresh produce!

VISQUEEN* film bags protect quality, cut spoilage losses!

When the management of Chicago's 14 Del-Farm Super Markets decided to try pre-packaging apples, oranges, potatoes and onions in VISQUEEN film, a brand-new idea in modern fresh produce merchandising was born.

It proved to be a profitable decision. By pre-packaging their fresh produce in VISQUEEN film bags, Del-Farm saved in many ways. Protected in VISQUEEN film, fresh produce stays fresh longer. Foods don't dry out. Spoilage is sharply reduced. Del-Farm gets better control of product quality. There's less handling needed—less clerk time to complete every sale. Customers like the sanitary advantages of modern VISQUEEN film packaging and women like the "bonus" value of VISQUEEN film bags—reusable in home refrigerators.

Why did Del-Farm select VISQUEEN film? Because it's pure, tasteless, odorless, strong and transparent. And low in cost. Want to find out what VISQUEEN film can do for you? Write today!

VISQUEEN FILM . . . a product of

THE VISKING CORPORATION

PRESTON DIVISION, TERRE HAUTE, INDIANA

MAIL THIS TODAY!

The Visking Corporation
Preston Division, Box P1410, Terre Haute, Indiana

I'm interested in pre-packaging fresh produce in VISQUEEN film. Let's have all the facts.

Name_____

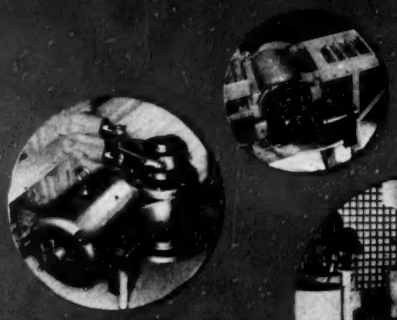
Firm_____

Title_____

Address_____

City_____ Zone____ State_____

*T. M. The Visking Corporation



On big jobs or little ones it pays to take advantage of Master's unusual ability to supply the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

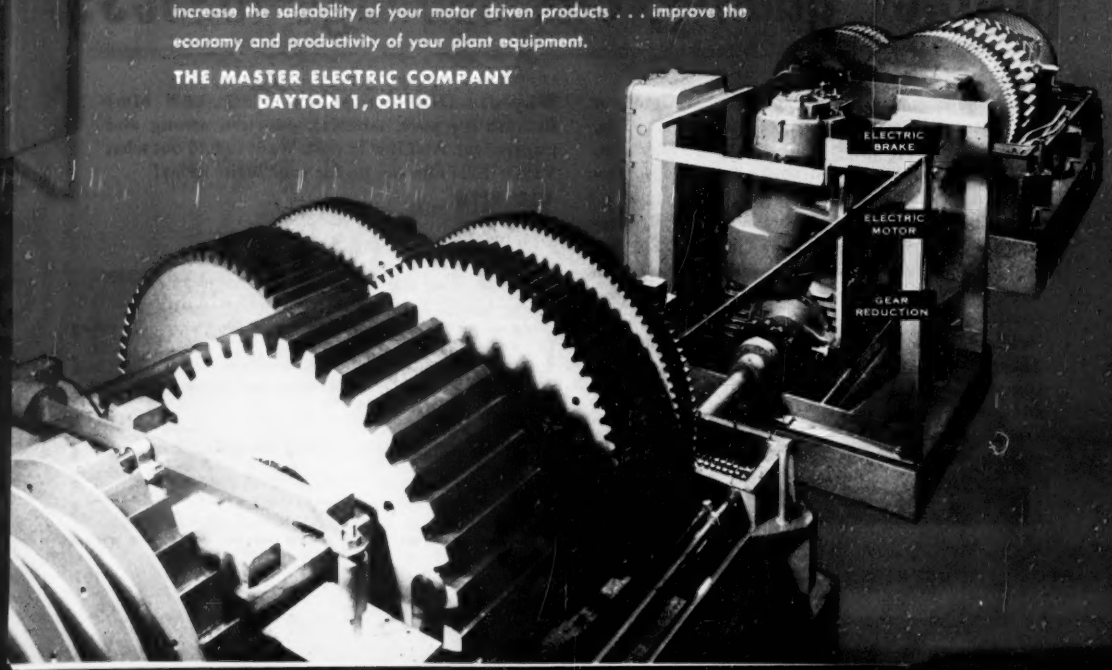
Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

little ones or BIG ones

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO



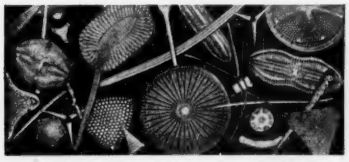
How Fruit Pressers Save Pressing Time . . . increase juice yields with CELITE Pressing Aids

Here is an easy, low-cost way to increase your juice yields, cut down pressing time and save wear and tear on your equipment.

Simply add a small amount of a Celite Pressing Aid to the pulp before pressing.

It works like this:

Celite Pressing Aids are diatomaceous silica powders. The tiny Celite particles, open and porous in structure, interpose themselves between the particles of solid pulp matter, opening up countless channels through which the juice escapes—freely and at lower pressure. More juice is thus extracted in less time. Press slippage is also eliminated, the drier cake is more easily removed and the cloths may often be replaced without the need for washing.



Photomicrograph showing a few of the many varied shapes which make up a Celite Pressing Aid. These minute particles form countless channels for the juice to escape.

Celite Pressing Aids are being successfully used in the pressing of practically all types of fruit products. They require no special equipment. And the saving in pressing time, together with the increase in juice yield and the saving on cloths and other equipment which results from their use generally more than pays for the cost of the small amount of Pressing Aid required.

For further information on Celite Pressing Aids, write Johns-Manville, Box 290, New York 16, N. Y.

WHAT USERS FIND

$3 Bag of Celite Pressing Aid Returns $57.40 Profit

(reported by J-M Engineer H. G. Martin)

Recently, one of my customers asked if we could increase his grape pressing yield.

I added one pound of a Celite Pressing Aid (about ½% by weight of grapes) and stirred it throughout the mass. The mixture was then placed in cheese racks under the hydraulic press.

Previously, the pressing operation had taken 16 minutes. With Celite, the press closed completely, producing a dry cake in nine minutes. Instead of requiring a total pressure of 1100 lbs. psi the press was finished at 600 lbs. psi. There was no slippage of the frames, the cloths cleaned better, and there was no breakage of cloths. In addition to this, the final yield of juice was so much greater that each $3.00 bag of Celite used resulted in an overall profit of $57.40.

One Hydraulic Press Load Convinces Jelly Maker

(reported by J-M Engineer T. A. Feuss)

When I attempted to sell a Celite Pressing Aid to this jelly manufacturer, the thought of putting a filter powder in his fruit to get more juice quicker seemed ridiculous to him.

However, a run was made, adding 1½% Celite to the guavas at the cookers. Observers remarked that they had never seen the press close so rapidly or so far. On emptying the press, the cheeses were quite dry and one laborer could remove them from the cloths because they sheared off by gravity. No cloths or lattices were broken, the juice was noticeably free from suspended mud and the cloths were replaced in the press without washing.

Sales Appeal Improved with Celite

(reported by J-M Engineer W. A. Reschke)

A trial run convinced this customer that he had much to gain by using Celite Pressing Aids in making jelly from frozen grapes.

The equipment used was a vertical hydraulic press. Without Celite, the centrifuges had to be cleaned 3 times a day. With Celite, they required cleaning only once a day. The customer also noted that the cloths were in better condition after pressing with Celite. Production of juice remained about the same, but the jelly was much clearer—it had better sales appeal—and judging from its appearance, a considerably longer storage life could be expected.

These advantages were obtained by the addition of 20 pounds of Celite to each 900-lb. batch of grapes pressed.

Celite Makes Apple Pressing Easier

(reported by J-M Engineer F. D. Richards)

During my first call on this customer, I recommended the use of 2% of a Celite Pressing Aid in their apple pulper.

Recently, when I called again, he informed me of the results. Ordinarily, with the kind of apple they are using at present, the press cake is squashy and slippery. With Celite, the cake is much firmer and they are able to operate the press at a higher pressure. This, according to their estimate, has increased the juice yield by approximately 5%.

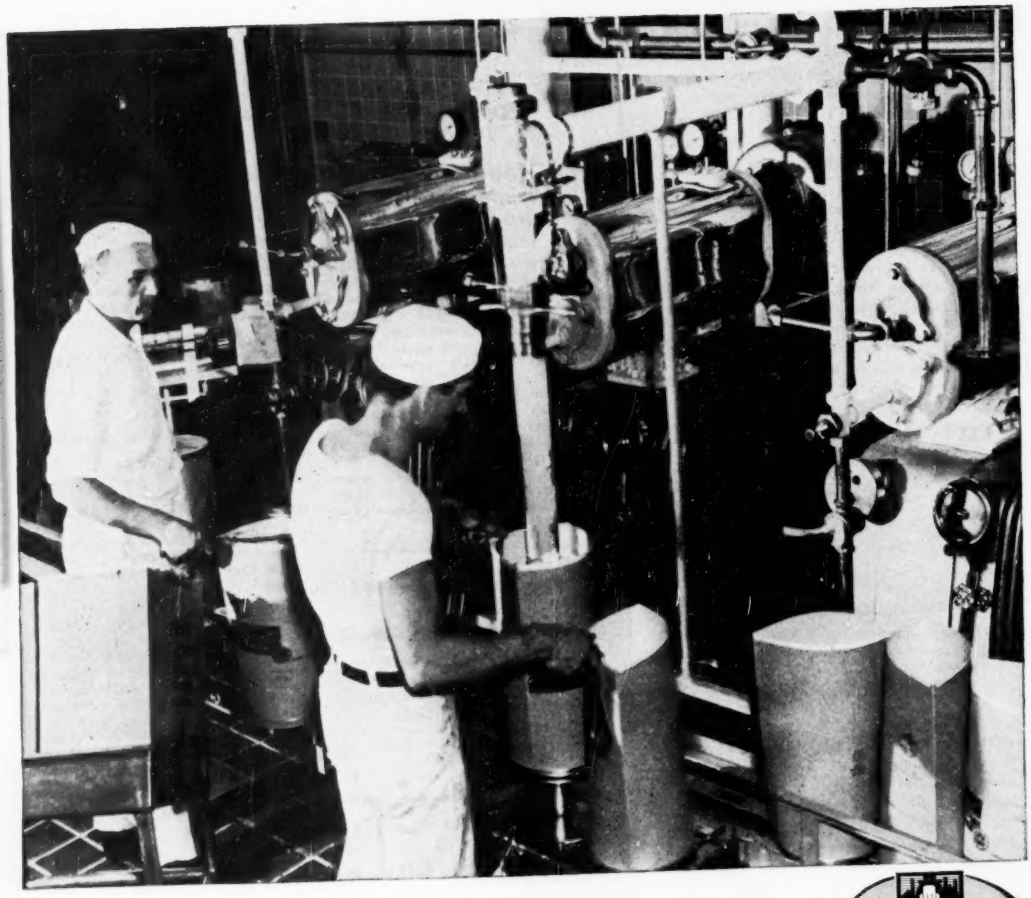
Johns-Manville JM PRODUCTS

Celite Pressing Aids

Reg. U. S. Pat. Off.

Enduro®

STAINLESS STEEL



REPUBLIC STEEL®

THRIFTY METAL OF 10,000 USES

For complete sanitation and ease of cleaning —ENDURO is unexcelled in tanks, conveyors, cookers, filters, kettles, pans, coolers, evaporators, freezing and packaging equipment. Say "pure foods" and you naturally think of ENDURO!

PURITY INCORPORATED!

● There's no greater guarantee of purity for foods than to have them processed throughout in ENDURO Stainless Steel. ENDURO's smooth, pore-free surface is sanitary-as-glass, easily cleaned, allowing no foothold for carry-over or contaminants. It is highly resistant to rust, corrosion, most acids and salts in process. On the other hand ENDURO is chemically inert—sets no metallic reaction of its own. Purity is *doubly secure.*

Strong and rugged, ENDURO takes hard service and abuse without showing wear and tear. There is no marring—no denting—no discoloration with age. After years of service, ENDURO equipment looks good as new—and continues to perform like new.

Naturally too—*profits* seem to gravitate to ENDURO-equipped processes. Cleaning and maintenance costs are very low—replacements few and far between—productivity high—and equipment life unusually long. In that atmosphere profits can't help but grow!

How healthy are *your* profits? Why not 'spot-check' your entire process line for weak or unproductive links? Then let us tell you more about ENDURO—"pure foods" metal and profit-maker.

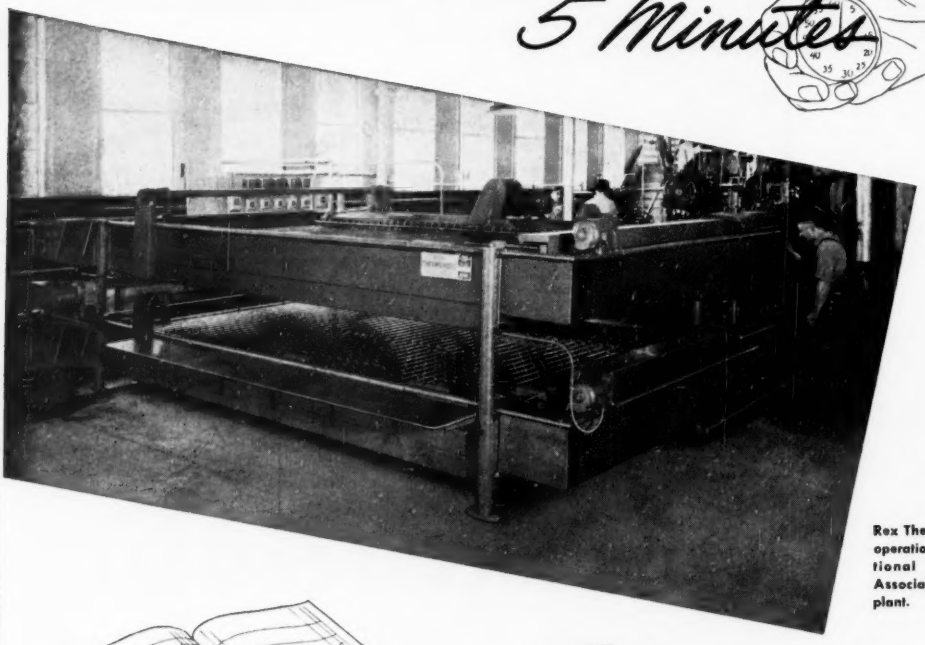
✔ **CHECK ALL 10 ADVANTAGES:** Rust- and Corrosion-Resistance • Heat-Resistance • High Strength • No Metallic Contamination • Sanitary Surfaces • Easy to Clean • Eye Appeal • Easy to Fabricate • Long Life • Low End Cost • *What more can be desired in a material?*

For Complete Details Write

REPUBLIC STEEL CORPORATION

Alloy Steel Division, Massillon, Ohio • **GENERAL OFFICES, CLEVELAND 1, OHIO** • *Export Dept.: Chrysler Bldg., New York, 17, N.Y.*

"cooling off period"... 5 Minutes



Rex Thermo-Roto in operation in a National Cranberry Association canning plant.

annual savings... Plenty!

From 72 hours to 5 minutes—that's the reduction in cooling time a cranberry packer is effecting by installing **Rex Thermo-Roto Coolers** in his canning lines. Before installation of the coolers, the hot canned sauce had to be taken off the line, set in boxes and left to cool from 24 to 72 hours, depending on the weather. Then the cans were taken from the boxes, put back in the line and moved on to labeling and crating.

Now the fast moving sauce line is uninterrupted in its trip from filling machines to the labelers. 410 cans of hot cranberry sauce enter and leave the cooler every minute. Detention time is only 5 minutes, and cans emerge 100° cooler and ready for immediate labeling.

Just look at the savings! The old method required nine men to handle the cooling operation: two men boxing, three men piling, three men unboxing and one on the conveyor. The **Rex Thermo-Roto** is turned on in the morning and off at the end of the day—that's the only manual operation required.

The cooling boxes cost 30 cents each, and 30,000 had to be on hand at all times. Furthermore, 5,000 new boxes were needed every year to replace broken ones.

The secret of this remarkably swift cooling of can contents is the rapid rotation of cans in a water bath which creates a turbulence in the can contents. The extremely rapid cooling cycle not only saves time, labor and plant space, but also checks the detrimental action of prolonged high temperatures and over-cooking. Product flavor, texture and color are preserved.

The **Rex Thermo-Roto** is used effectively for cooking or cooling most liquid or semi-liquid food products. Why not investigate the big savings it can make in your operations? Write to **CHAIN BELT COMPANY**, 1616 W. Bruce Street, Milwaukee 4, Wisconsin.

CHAIN BELT REX COMPANY ... FOOD PROCESSING EQUIPMENT

natural or synthetic

vitamin A

DPi specializes in both

DPi Distilled Vitamin A Concentrate

For use in pharmaceutical or food products, old or new, there is no natural vitamin A more uniform and stable—none more effective biologically. DPi's molecularly distilled vitamin A is unexcelled among concentrates from natural materials for blandness.

Supplied in any potency you specify from 50,000 to 500,000 U.S.P. XIV units per gram, in containers ranging up to 55-gallon drums.

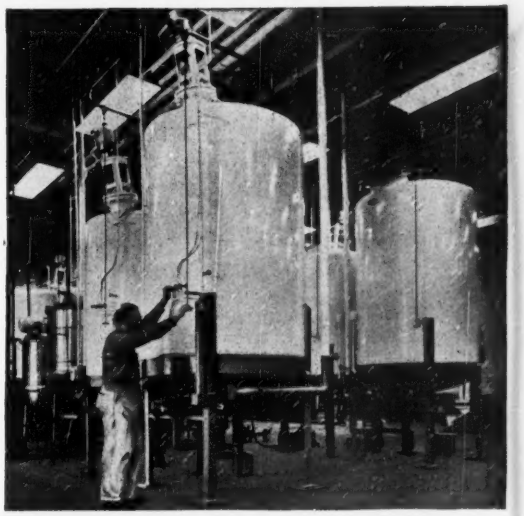
Myvax 16 Synthetic Vitamin A Palmitate

For use in high-potency preparations, this product of synthetic chemistry has constant stability and biological activity comparable to that of distilled natural vitamin A esters at the same potency. Its stability in the presence of polar solvents is high, and its taste and odor are mild and pleasant.

Offered for prompt shipment in potencies of 700,000 to 800,000 U.S.P. XIV units per gram.

DPi also supplies Myvax® Synthetic Vitamin A Acetate—ideal for use in oil solution.

DPi



ONE CAN . . . ONE BATCH OF MARGARINE

Myvapack® Distilled Vitamin A Concentrate is packed to your order—custom-blended in these great tanks. Each sealed can contains exactly 400 grams of oil with the correct potency to enrich one batch of your product. Easy to ship and store.

For full information, quotations, and samples of any DPi vitamin A product write, telephone, or wire

DISTILLATION PRODUCTS *industries*

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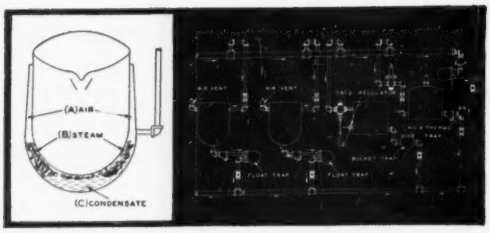
Charles Albert Smith, Ltd., Montreal and Toronto

Distillers of Oil-Soluble Vitamins and Other Concentrates for Science and Industry; Manufacturers of High Vacuum Equipment



GOOD STEAM PRACTICE

Simple as ABC

A Air and other gases in steam lines or equipment not only reduce the effective temperature of the steam, but create insulated cold spots wherever there is an accumulation. These gases are constantly generated in the boiler and air is always present when starting up. Ask for Bulletin No. 275 (Air in Steam).

B Dry steam can be delivered at the point of use only by trapping condensate from mains, risers, coils, etc. The amount of steam and therefore the temperature of the room, process, press, tank or oven, can be controlled to within a degree or two by selecting suitable Sarco Temperature Controls.

C The speed of the work can be maintained and fuel efficiency insured at top level by removing condensate with the right Sarco Steam Trap based on calculations and recommendations given in Sarco Bulletin No. 1600.

No. 9 — FLOAT THERMOSTATIC — BUCKET

255

SARCO SAVES STEAM

SARCO COMPANY, INC.
Represented in Principal Cities
Empire State Building, New York 1, N.Y.
SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

ah! what delicious flavor

You'll agree, your customers will agree, it's the FLAVOR that makes the meal.

D&O has the Perfect Flavor and the correct flavoring materials to serve your every specific flavor requirement starting from shrimp cocktail sauce, to soup, to gravy... including powdered dessert and cake frosting.

SPICEOLATES,
the water-soluble spice flavors made by D&O from pure natural oils and oleo resins offer greater economy and completely uniform flavor quality. Spiceolates are pure products in every respect.

Additional information concerning the use of Spiceolates on request.

For better flavors . . . consult D&O.

D&O **DODGE & OLCOTT, INC.**
180 Varick Street • New York 14, N. Y.

ATLANTA • BOSTON • CHICAGO • CINCINNATI • DALLAS
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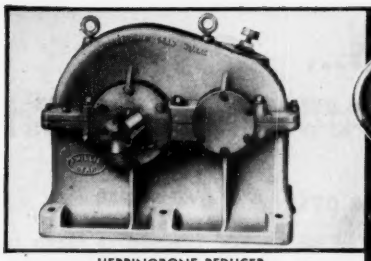
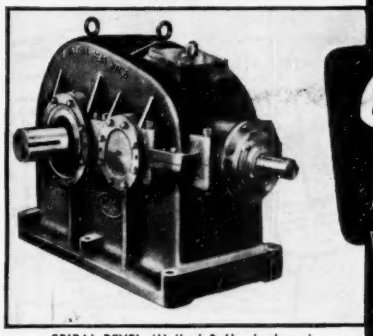
PHILLIE GEAR

SPEED REDUCERS

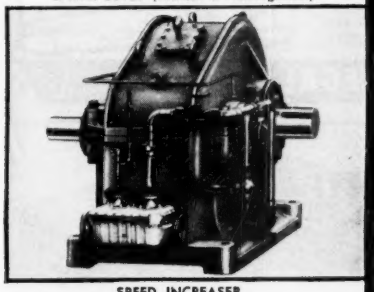
One Name ALL TYPES



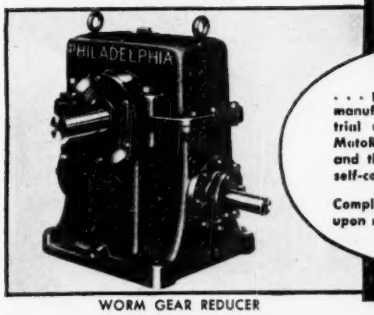
HERRINGBONE REDUCER



SPIRAL BEVEL (Helical & Herringbone)



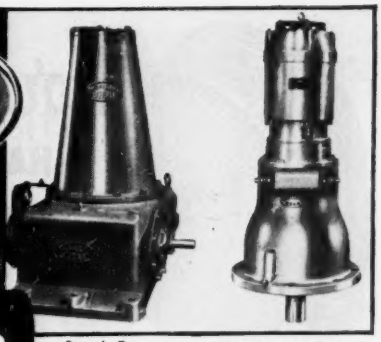
SPEED INCREASER



WORM GEAR REDUCER

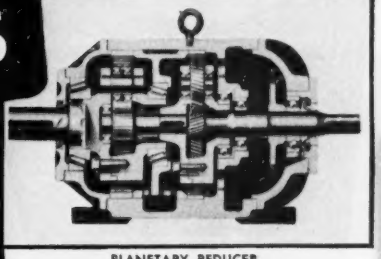
. . . produced by a Pioneer in the design and manufacture of Gear Driven Reducers for industrial use. Also the well-known, self-contained MotoReduceR (in horizontal or vertical drives)—and the Philadelphia GearMotoR (a horizontal, self-contained reducer) for drives up to 60 H.P.

Complete catalogs on any type of Reducer, sent upon request on your Business Letterhead.

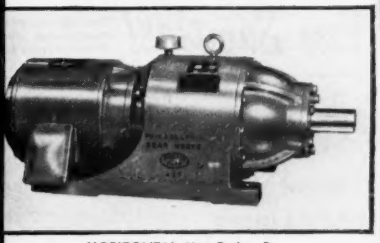


Steeple Type WORM REDUCER

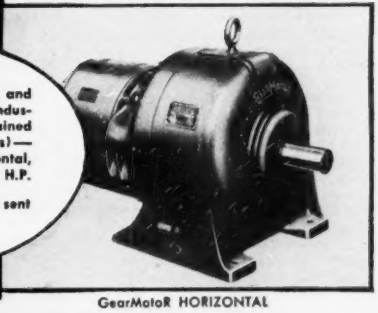
VERTICAL MotoReduceR (With Planetorque)



PLANETARY REDUCER



HORIZONTAL MotoReduceR



GearMotoR HORIZONTAL

Philadelphia Gear Works, INC.

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Industrial Gears and Speed Reducers
LimiTorque Valve Controls

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SAVING OVER **70%** OF YOUR WOMEN WORKERS' HEADWEAR COSTS!

KORONET HAIR GUARDS ARE NATIONALLY FAVORED *Because*

- ✓ They are sanitary. Hair always completely covered—simply, smartly. Permit natural air circulation.
- ✓ They are economical. Cost only a few pennies more than an ordinary hairnet. Neatly webbed, of strong durable texture, designed for long service. No laundering, starching or ironing bills.
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- ✓ They are comfortable. Cool, light, snug fitting, adjustable to any headsize.
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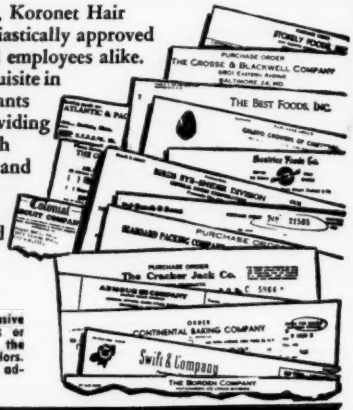
● Wherever introduced, Koronet Hair Guards have been enthusiastically approved by both management and employees alike. They are now a prime requisite in major food processing plants here and abroad. By providing your women workers with this economical, sanitary and attractive product you are performing an essential service for your plant and your employees.



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The KORONET Hair Guard is an exclusive patented product. Any name, trademark or slogan you desire can be imprinted on the shield in your choice of one or more colors. This is an ideal and inexpensive way to advertise your products.

Free Samples!

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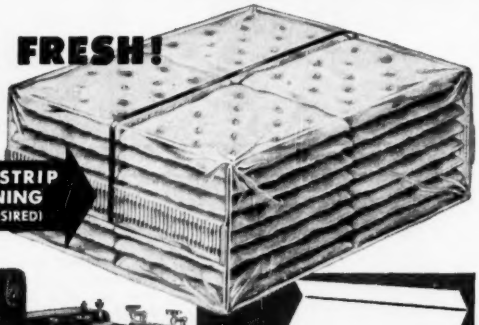
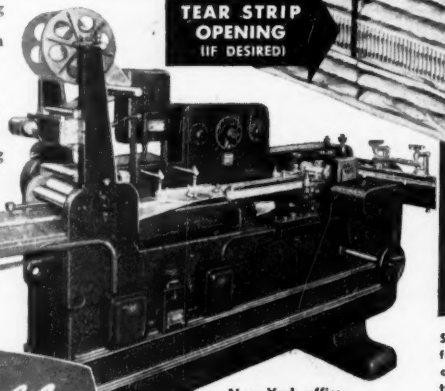
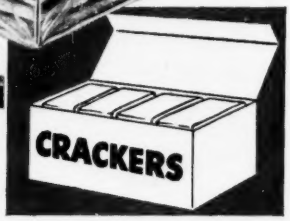
Always SO CRISP...SO OVEN FRESH!

HIGH SPEED, MOISTURE-PROOF ¼ lb. PACKAGING... *WITHOUT BREAKAGE*



Continuous feed "float" wrapping — at faster than ever production line speed from ovens to market with less waste and breakage loss—less operator help! Hermetical heat glue, or crimp sealing keeps moisture and dryness where you want it . . . prevents flavor loss and keeps crackers "oven fresh" indefinitely. Uses any type wrapping material such as cellophane, glassine, waxed papers, etc. Available types for wrapping ¼ lb. cracker packages as illustrated, or single and multiple packages for individual servings — as well as cookies and cakes. Helps to build profits by selling quality at reduced operating expense. Write for completely illustrated brochure today.





Standard model No. 2W-10 is designed for individual needs with straight, L-shape or hopper type feed. Wrapper limitations are twelve inches long by a combined width and height of fifteen inches. Custom machines for special sizes available.

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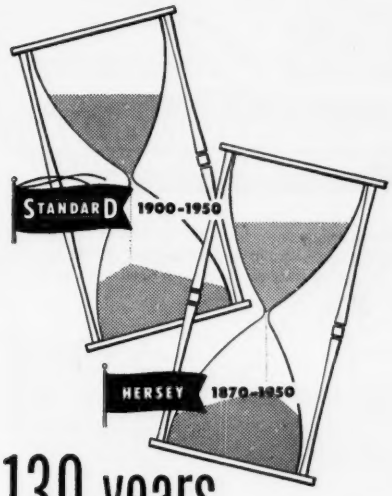

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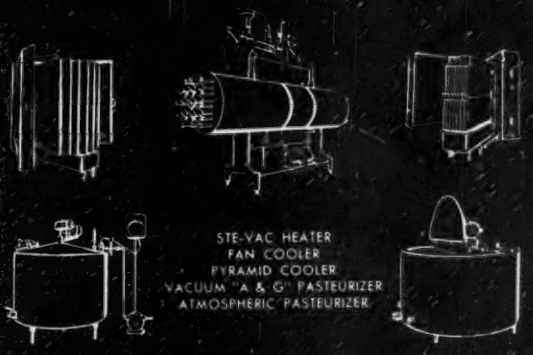

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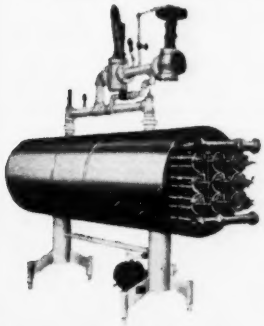
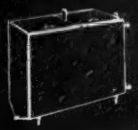


The STE-VAC HEATER

BEVERAGE COOLERS



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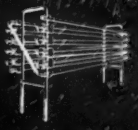

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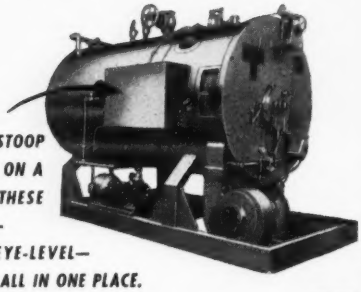

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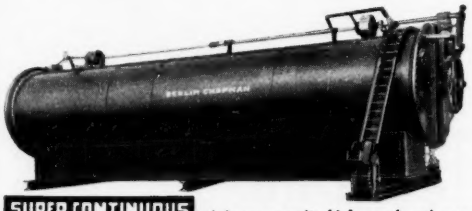

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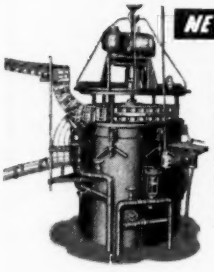

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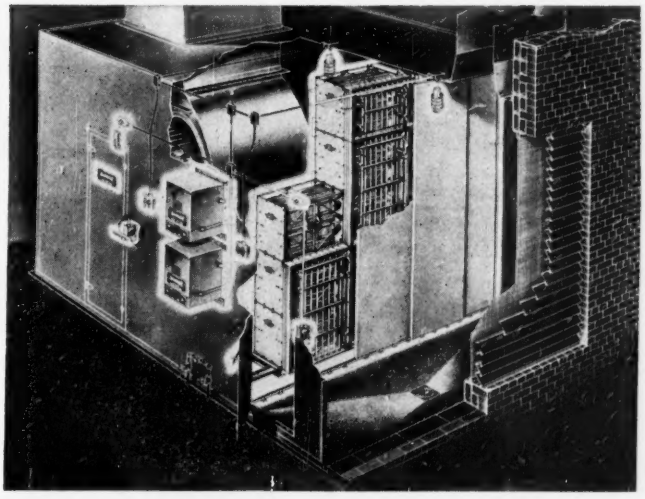

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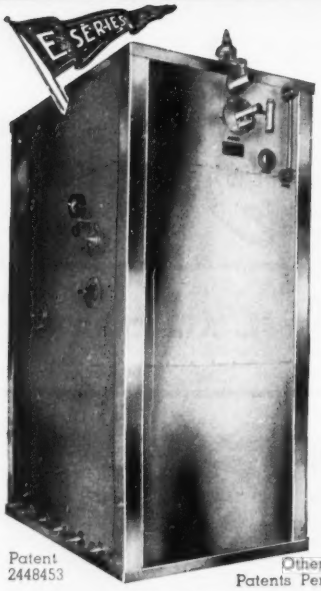

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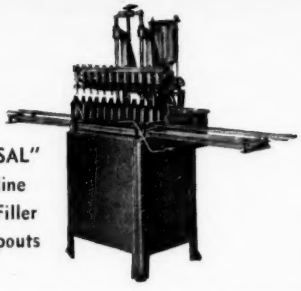

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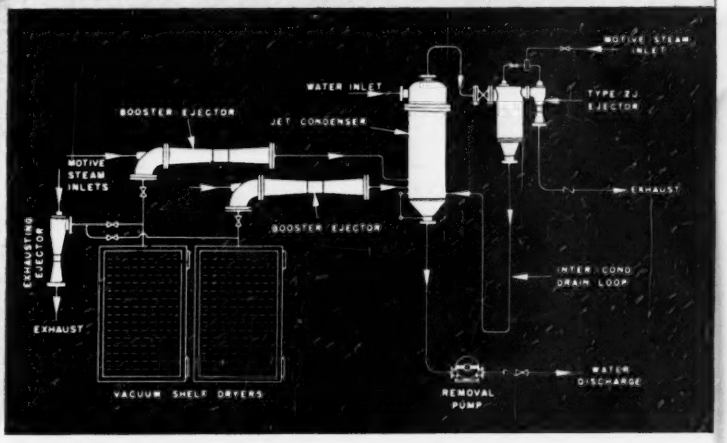

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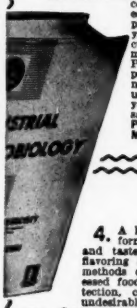

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4. A handy source of reference information on every aspect of flavor and taste. Includes the chemistry of flavoring agents and condiments . . . methods of developing flavor in processed foods . . . methods for the detection, correction, and prevention of undesirable flavor in commercial products. Covers everything from natural sources of taste, essential oils of flavor interest and flavor changes on storage, to beverage appraisal by taste and commercial quality scoring. **By C. E. Crocker, Arthur D. Little, Inc. 172 pages, $3.50.**

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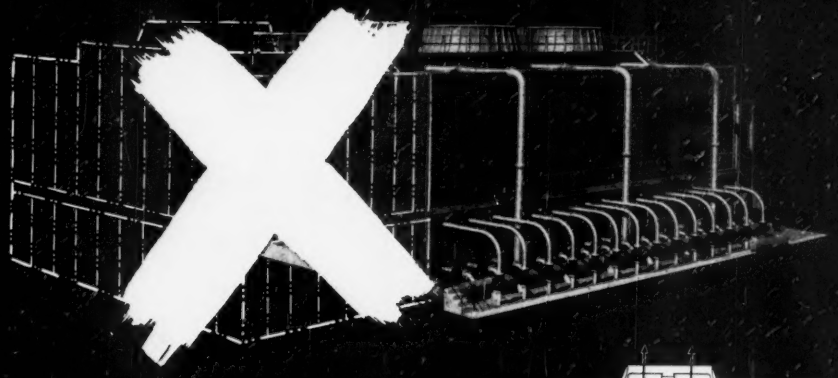

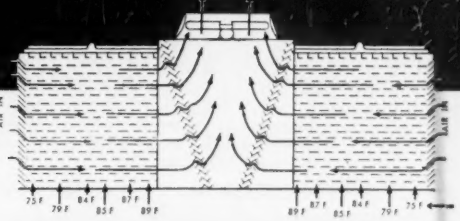

Typical water temperatures in a Double-Flow tower just before water enters the cold water basin. Temperature of water in cold water basin is 86 F.

The cross-flow of dry air entering the Double-Flow tower through the entire height of the louvered side wall cools water in this area to almost wet bulb temperature. Water in a cross-flow tower is cooled from outside-inside as well as from top to bottom.

Several years ago, one of America's largest pipeline companies installed Marley Double-Flow cooling towers at each compressor station. Recently, an unprecedented demand for natural gas caused each station to be "beefed up" to carry the unexpected heavy load.

A Marley Application Engineer was called in to give his recommendations for enlarging the cooling towers to give the colder water needed to cool the heavily loaded gas coil circuit.

After a complete survey of the water cooling needs, he found that colder water was needed to cool the additional load in the gas coils, but that the compressor engine jacket water cooling circuits and the compressor itself could operate with slightly warmer water.

Instead of recommending an extension of each existing Double-Flow, he explained how the Marley Double-Flow cooled from "outside-in" as well as from top to bottom. This results in near-wet bulb temperature water falling in the collecting basin near the louvered side walls.

By installing longitudinal partitions in the cold water basin near the louvered walls, water 7 F to 9 F colder than that specified on the original cooling tower installation could be circulated over the gas coolers . . . and the customer's problem was solved without a capital expenditure.

Yes, MARLEY LOST A SALE—But the customer SAVED MONEY . . . PLENTY OF IT!

This is but one of the many case histories on file proving that Marley "know-how" and Marley Double-Flow cooling towers will do any job better and at less cost. In this case, ONLY A MARLEY DOUBLE-FLOW could have solved the problem. And, ONLY MARLEY DOUBLE-FLOW will give Cross-Flow Water Cooling—an Open Distribution System—Mortise Lock Filling—Low Draft Loss—Marley Mechanical Equipment and other exclusive Marley features. Truly, TOMORROW'S COOLING TOWER IS HERE TODAY . . . at MARLEY!

Get more for your money . . . Save time . . . Save trouble. Ask a Marley Application Engineer to work with you, from the "blue-print" stage on. He'll help you solve your problem without cost or obligation.

MAIL THIS COUPON TODAY

The Marley Company, Inc., Kansas City 15, Kansas

- ☐ Please send FREE copy of "What's Your Cooling Tower I.Q.?" Illustrated folders available on Cooling Tower Operation, Maintenance, Water Treatment, Testing, Specifications.
- ☐ Send Double-Flow Bulletin DF-50.
- ☐ Have Marley Application Engineer call. FI-6

Name _____ Title _____

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Vairflo

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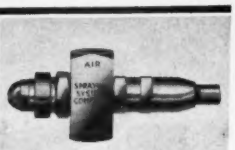
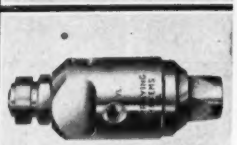
are you "up-to-date" on SPRAY NOZZLE developments . . . *for example*

✓ Spraying Systems Pneumatic Atomizing Nozzle with Cleanout Needle . . . spring loaded cleanout needle is open in normal position. When pushed into orifice, cleans out entire orifice passage. Write for Data Sheet 4198.



✓ Spraying Systems Pneumatic Atomizing Nozzle for Automatic Operation . . . provides intermittent operation. Typical use is automatic lubrication of molds . . . with lubricating operation indexed to press cycle. Write for Data Sheet 4547.



✓ Spraying Systems Pneumatic Atomizing Nozzle with Steam Jacket . . . for spraying liquids requiring above-room temperature. The nozzle is easily removed from the jacket. Write for Data Sheet 4610.

WRITE and tell us the details of what you want to accomplish in spraying . . . our engineering facilities are at your service. Also . . . do you have General Catalog No. 22?

SPRAYING SYSTEMS CO. BELLWOOD, ILLINOIS
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(Suburb of Chicago)

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BIN-FLO Aerating Units Keep Things Moving

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Please send new 36-page catalog giving complete information and specifications on BIN-DICATORS. Also please send information on BIN-FLO Aerating Units. F1-6

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CARROT OIL makes foods golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil, and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

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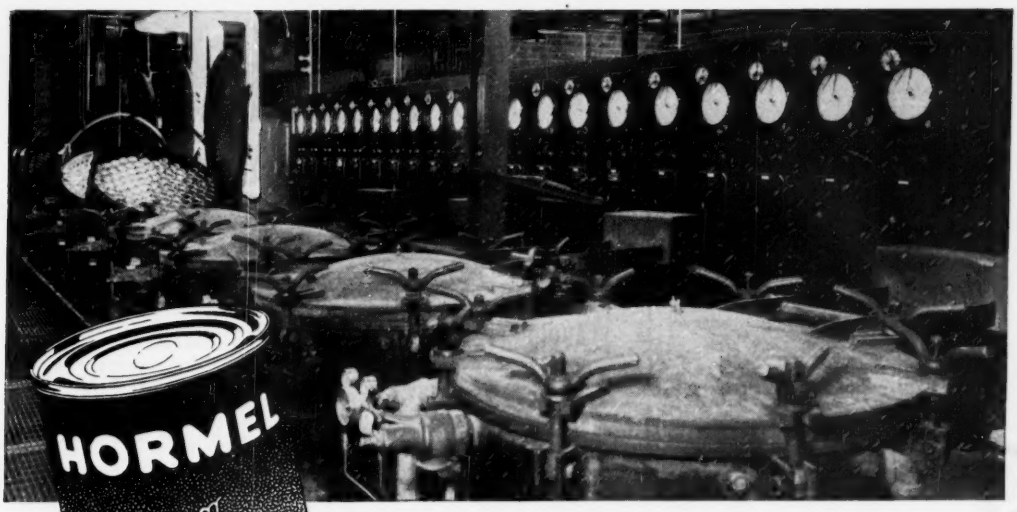
NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

If this or other advertising does not supply the information wanted concerning materials for the food manufacturer, please write:
FOOD INDUSTRIES



Best known name in Chili protected by Automatic Retort Control

THE famous name, flavor and premium quality of Hormel Chili Con Carne at the new plant in Dallas, Texas, is protected by Taylor push-button control. That long row of Taylor Fulscope* Controllers with Process Timers (above photo) are automatically operating 20 retorts at maximum capacity—and delivering product quality that meets the rigid high-quality standards, for which Hormel is famous.

Here's what this newly installed Taylor SP-6A (Steam Cook, Pressure Cooling System) Retort Control System gives Hormel, once the operator pushes a start button:

Automatic Venting

Automatic Temperature Control At Processing Point

Automatic Timing Of Process Period with steam being automatically shut off at the end of this period.

Automatic Pressure Control During Cooling by economic use of compressed air in retort.

Consistent, Uniform Cooling To A Specified Temperature

Termination Of Cooling At A Specified Point with automatic blow-down and drain of retort.

Signal Flash Telling Operator Cycle Is Completed

Precision Instruments, processing know-how, and quick service from experienced Field Engineers when it's needed are three big reasons why leading canners standardize on Taylor Instrumentation. That's why we say, specify "Taylor-Equipped, As Usual!" Your Taylor Field Engineer will give you complete details on controls for Retorts, Blanchers, Juice Heaters, Lye Peelers, Exhausters, Continuous Cookers, Cooling Canals, Deaerators, Jam and Jelly Kettles, etc. WRITE FOR CATALOG 500! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.

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MEAN
ACCURACY FIRST
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NEW ADVERTISEMENTS received by 10 A. M. June 21st at the New York Office, 330 W. 42 St., N. Y. 18, N. Y. will appear in the July issue subject to limitations of space available

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

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CANNED GOODS. Representation required by Company of 50 years standing having established connection with Principal Grocery and Provision Distributive Houses United Kingdom. Packers wishing to extend their business now and in post-control period are invited to write to Box H 317 c/o Streets, 110 Old Broad Street, London, E.C. 2, England.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

FOOD TECHNOLOGIST, 13 years experience, M.S. degree, knows canning and freezing, quality control. Wealth of experience in Field and Technical Service. Not only knows sanitation but has the background pertaining thereto plus the knowledge of chemicals involved. Desire Adm. Assts. position or open to offer. Presently employed. PW-6741, Food Industries.

CHEMIST, AGE, 25, wants career in food industry with progressive organization in research and or production. Advanced work on M.S., some experience, fine background, ambitious, energetic, and original. Married. PW-6714, Food Industries.

MIDDLE AGED Working Foreman. Capable, many years practical experience in the canning and preserving industry. Tomatoes, vegetables, preserves, jellies. Bakers specialties, other specialties, available immediately. Will relocate. PW-6692, Food Industries.

CHEESEMAKER: EXPERT in Italian types, desires responsible position with reputable company. PW-6732, Food Industries.

FOOD PRODUCTS Manager, age 40, with 22 years experience, Plant lay-out, Purchasing, Manufacturing, Supervision, Quality Control, Costs, and Selling of Preserves, Jellies, Mayonnaise, Syrups, Fountain and Bakers Supplies, Sauces, Canned Fruits, Vegetables, Meats, Soups, and other specialties. Available as General or Production Manager after June 15th. PW-6744, Food Industries.

ESSENTIAL OIL And Flavor Chemist, previous food experience, M.A., 29, seeking association with food, beverage, confectionery industries. Presently employed. PW-6766, Food Industries.

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Our client, seasoned, capable Sales Executive, experienced foods, drugs, chemicals, building materials. Invaluable statewide contacts—unquestioned bank, commercial references. Can save months of expense & trouble for organization desirous of improving position in Southwest. Handle special assignments or few selected lines. Write

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FLAVORING MATERIALS
SALESMAN

Long established firm, operating nationally, offers mid-western territory to an experienced man who is familiar with flavor using industries in Illinois, Michigan, Wisconsin, Minnesota, Indiana and St. Louis. Your headquarters will be in Chicago. Salary plus expenses. Tell your story in your first letter giving complete resume of personal and business background. Our organization knows of this ad.

SW-6723, Food Industries
330 W. 42nd St., New York 18, N. Y.

PRODUCTION SUPERINTENDENT

Wanted for food processing plant specializing in mixes. Experience with Pneumatic Scale Company equipment helpful. List qualifications, record of past employment and age. All replies held in strict confidence. Write

P-6621, Food Industries
520 N. Michigan Ave., Chicago 11, Ill.

FOOD CHEMISTS
JR. AND SENIOR

Investigate our active confidential service for the better position. Appointments at your convenience.
Call, write or wire:—Gladys Hunting (Consultant)
DRAKE PERSONNEL
7 W. Madison St. Chicago 2, Ill.

Engineers - Executives - Technical Men

Salaried Positions, $4,000 to $30,000. This Confidential service for men who desire a new connection, will develop and conduct preliminary negotiations without risk to present position. Send name and address for details.

TOMSETT ASSOCIATES
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WANTED

Large engineering firm wishes to acquire several complete food plants through purchase of (1) capital stock, (2) assets, (3) machinery and equipment, whole or in part. Personnel retained where possible; strictest confidence.

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FOR SALE
COMPLETE EQUIPMENT

for making Caramel Corn on productive basis. Thorough knowledge of manufacturing goes with equipment.

REYNOLDS POPCORN CO.
101 S. Sycamore St. Osgood, Ind.

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to USDA standards
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RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
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PIE AND PASTRY MAKING
CAKE DECORATING
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VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Foreladies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS
Box 383 CORAL GABLES 34, FLORIDA
Telephone: 83-7301

WANTED

WANTED

Resina Automatic Capping Machine or similar make for 58 mm cap.

THE HUBBARD APIARIES
ONSTED MICHIGAN

MACHINERY WANTED
Model B Transwrap
IN GOOD CONDITION

Give Details. S. Schnitzer
LEAF BRANDS, INC. Chicago 51, Ill.

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UNION Rebuilt Machinery — Established 1912

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J. H. Day 700 gal. Steam Jacketed Jumbo Mixers, motor driven.

Lee 400 gal. stainless steel steam jacketed Mixing Kettles.

F. J. Stokes, J. H. Day, New Era, Hottman Mixers, from 2 gallons up to 450 gallons, with and without Jackets, Single and Double arm Agitators.

Baker Perkins type, JNM and Readco Heavy Duty 100-150 gal. Double Arm Jacketed Mixers. Sigma or Fish Tail Blades.

Mikro 4TH, 2TH, 1SH and Bantam Pulverizers; Jay Bee 3AT and U1, Schutz-O'Neill, Stedman Mills.

Day #31 Ro-Ball, Schutz-O'Neill #3 Sifters; Gayco 8 ft. Air Separator.

Colton, F. J. Stokes and Eureka, RD3 and DDS2 Rotary Tablet Machines.

Pony M, ML and MX Labelrites, Ermold and World Semi and Fully Automatic Rotary and Straightaway Labelers.

Pneumatic Scale automatic Duplex Straight-line Labeler, 120 per min., front and back labels, Flasks and Quarts.

Knapp E adj. Wraparound and Spot Labeler, also for jars with ears.

Burt Automatic Wraparound Labeler.

Stokes & Smith G1 & G4 Auger Fillers.

Triangle Package Models G2C, A2C, N2CA and A60A Electri-Pak Fillers.

Triangle SHA Auto. Net Weigher, High Speed adj. Semi-Auto. Carton Sealer.

Ertel 12-head S.A. Vacuum Filler.

Filler 1, 2, 4, and 8 head Stainless Steel automatic Piston Fillers, Rising Bed feature and automatic Feed.

Horix Stainless Steel Rotary Filler.

Stokes 90D auto. Tube Filler & Closer.

Ayars Rotary Filler #10 Cans, etc.

Colton 4 PF Worm-type Cream Filler.

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Ceco auto. Carton Closing Machine.

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Write, Phone, Wire Collect for Details and Prices on your Requirements

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TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

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Carton Gluer: Packomatic, with Sealer.
Colloid Mill: Charlotte mod. 100, 3 hp.
Dryers: 2- 6'x40' Davenport hot air rotary.
Mixers: 80 qt. 3 and 4-speed Hobart Vertical.
Mixer: 120 qt. Glen Power Plus, var. speed.
Mixers: Powder: 20-20 Burton, 1000# Robinson.
Kettles: Stain. Steel, all sizes, new and used.
Kettle: 200 gal. Dopp jacketed, agitated.
Powder Fillers: Stokes & Smith, Stokes, Triangle, Gump, McMinn, Howes, Day, Weigh Right.
Filter Presses: 7", 12", 24", 30" cast iron.
Fillers: Geyer, Kiefer Visco, M&S.
Pulverizers: Micro #2TH, #4, 24".
Labelers: New Jersey, World, Knapp, Burt.
Kettle: Stain. Steel 200 gal. with agitator.
Cappers: Resina, Capem, Pneumatic, U. S.
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Send us a list of your idle equipment

LOEB EQUIPMENT SUPPLY CO.
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FOR SALE

100 qt. Read Vertical Mixer
80 qt. Hobart and Triumph Mixers
Enterprise Grinder with 8½" plates
Burns Peanut Roasters, Cooling Truck, Blowers and Blanchers
Buffalo Chicle Chopper

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Burt Universal Labeler Model 404. Good condition. Used three months. Priced for quick sale.

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FOR SALE

2-PROCTOR SCHWARTZ DRIERS

As is where is. Suitable for vegetables or other materials where apron driers can be used.

FS-6634, Food Industries
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BUY BRILL

4—Ross 2-truck Steam Tray Dryers, 500 sq. ft. drying surface, with trucks.
1—Oliver 3'x2' Rotary Vac. Filter.
4—Shriver 30", 24", 18", 12" Cast Iron P&F Filter Presses.
2—#2 Sweetland Filters, Stainless Steel.
1—Bird 18" x 28" Monel Continuous Centrifuge.
2—Tolhurst 40", 32" Suspended Centrifugals, monel perforated baskets.
1—Tolhurst 26" S.S. Centrifugal, solid basket.
1—Fletcher 32" Suspended Centrifugal, solid basket.
5—Rotex Sifters, 40"x84", 40"x120".
25—S.S. Kettles and Tanks, 50 to 500 gal.
3—Knapp, Burt Automatic Can Labelers.
3—Mikro Pulverizers #1SH, 2TH and 4TH.
12—Day, Robinson Powder Mixers, 100 to 4000#.
2—Stokes & Smith Model G-1 Fillers.
1—Anderson Duo Oil Expellers with tempering apparatus.
1—Davenport 5' x 25' Rotary Steam Tube Dryer.
3—Allis-Chalmers 120 bushel Rotary Steam Tube Dryers.
1—Black & Clawson 28"x60" Atmospheric Double Drum Dryer.

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BRILL EQUIPMENT COMPANY
2401 Third Avenue, N. Y. 51, N. Y.
Telephone Cypress 2-5703

FOR SALE

28" x 60" to 32" x 120" Double Drum Dryers.
24" x 20" Buflovak Vacuum Drum Dryer.
50 gal. S.S. Jkt., Agit. Kettle.
100 gal. S.S. Clad Jkt. Kettles, 30" x 52".
100 to 300 gal. S.S. Mix Tanks, water jkt.
150 to 350 gal. S.S. Tanks.
Ft. Wayne Sterilizer, (agit.) 4' x 4'6".
Premier Colloid (Paste) Mill, 7½ H.P.
2000 and 3000 gal. Pfaudler Tanks, agit.
125 to 1500 gal. Homogenizer or Viscolizers.
3' to 6' S.S., also Copper Vacuum Pans.
D-8 Day Mixer, jacketed, m.d., 800 lbs. cap.
"Lightnin" Portable Mixers, 1/3 and 1/4 H.P.
Model 148C Stokes High Vacuum Pump, 1½ H.P.
World Automatic Rotary Labeler.
100 ft. Gravity Conveyor, 2½" x 14" Rollers.
Elwell Parker Skid Lift Trucks, 4000 lbs.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street, New York 17, N. Y.
Murray Hill 2-4616

LIQUIDATING EQUIPMENT

Former SIBONEY DISTILLING CO. PHILA.—Gravity Conveyor, Power Boosters, Tanks, Pumps, Automatic Bottling Machinery, Beer Still, Gin Stills, Yeast Machine.

FOR SALE FROM STOCK

2—MOJONNIER #90 Auto. Rotary Vacuum Fillers, 14 spout, stainless.
1—INTERNATIONAL Auto. Vacuum Filler, 12 spout, stainless steel.
1—Pneumatic Scale Auto. Inverted Air Cleaner, 6-wide.
2—Burt Wrap Around Labelers.
1—Natl. Pack. Mchy. Auto. Powder Filler, 2-spouts in tandem.
1—J. H. Day #9 Cincinnatus double arm mixer, sigma blades, non-jktd. 200 gal. working cap.
2—Sharples Super Centrifuges #16V, Vaportite, dual purpose bowls, stainless steel contact parts.

Large stock of stainless steel tanks and kettles

PERRY EQUIPMENT CORP.
1511 W. THOMPSON ST. • PHILA. 21, PA

WE CAN FURNISH AT ANY POINT NEW AND USED TIGHT AND SLACK BARRELS AND STEEL DRUMS, PAILS AND KITS. LET US HAVE YOUR INQUIRIES.

BUCKEYE COOPERAGE CO.
3810 Orange Ave., EXpress 3383, Cleveland 15, O.

Try It FMC Buy It

RENTAL PURCHASE PLAN

Stock No.	Description
2879	5 Stainless Vacuum Vessels 250 gal to 1250 gal.
2587	3 Stainless Jacketed, Agitated 150 Gal. Kettles; 100# Pressure
3001	Spinner Cooler for No. 10 Cans
2662	2 Pfaudler Glass Lined Vacuum Cookers; 500 gal & 2500 Gal.
2986/K17	Two J. H. Day 75 Gal. Cream Beaters
2487/W13	Standard Knapp Aut. Case Gluer and Sealer; 429-606 complete
2849/F1	Four Basket Hor. Retort; 40" x 18'
2819/M	5 Berlin Chapman Retorts 42" x 54" with Taylor instruments
2872/P2	Mt. Gilead Hyd. Press 24" x 24" with pump
2919/J5	Screw Type Dewatering Press 10" x 50"
2700/C2	Karl Kiefer Stainless 16 Spout Rotary Vacuum Filler
2965/B2	Rietz Stainless Disintegrators; 30 HP—50 HP
2184/B43	Six Filler Machine Co. Piston Fillers; four to 11 pistons
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2986	2 M.&S. 6 Pocket Fillers for No. 2
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